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ABSTRACT

A review of 110 studies of bilingualism and bilingual education or related topics focuses on investigations of the effects of bilingual education and bilingualism on the academic and cognitive development of children and young adults. The review is divided into sections covering: speaking; listening; writing and language skills; reading; general language proficiency; language usage; mathematics; science; study skills; cognitive and linguistic strategy and development; self concept; classroom behavior; school attendance; student orientation, attitudes, and motivation; language aptitude; personality; social development; language/learning disabilities; student employment; parent attitudes and involvement; teacher and principal attitudes; teacher employment; instructional materials; teaching styles and methods of instruction; and bilingual education as an intervening or dependent variable. Other bodies of related literature are briefly reviewed, and a concluding summary outlines some major themes and ties them to the theory of language and thought developed by Vygotsky. An annotated reference list and a bibliography of other literature reviews and theoretical works of interest are appended. (MSE)

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BILINGUAL EDUCATION AND BILINGUALISM:

A Review of Research Literature

Sylvia Larter
Maisy Cheng

#175

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A Review of Research Literature

Sylvia Larter
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September 1984

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INTRODUCTION

On July 26, 1982, the Board of Education for the City of Toronto (TBE) approved Recommendation #48 of the final report of the Work Group on Third Language Instruction:

> #48 That the Director of Education develop a comprehensive, in-depth documentation report based on available research and other valid information documents on the subject of bilingual/trilingual education.
> (The Board of Education for the City of Toronto, March, 1982, p.47)

This document is the result of work done to carry out that recommendation. The document has gradually evolved so that it is now a review of 110 research studies conducted during the past twenty-five years on the subjects of bilingual education and bilingualism and that are available in the English language through the Library Services Department of the TBE. Research on trilingual education is virtually nonexistent and so the term has not been included in the title of the document although the couple of studies that were found are incorporated.

Bilingual education is defined as the use of two languages as media of instruction in part or all of the school curriculum and may be organized according to a variety of models such as immersion, morning-afternoon repeated instruction, alternate days non-repeated instruction or concurrent/simultaneous translation. It does not include school programs where a second language is taught solely as a subject such as in the cases of ESL and FSL programs.

In some instances, bilingual education involves two languages that are official in a country; in Canada, the languages would be English and French; in Ireland, English and Irish; while in the Philippines, they would be two of English, Pilipino and Spanish.

In other instances, bilingual education involves one language that is official and one that is non-official. In Canada, the non-official language could be Chinese; in Sweden, Finnish; while in Iran, it could be English.

When the non-official language is also the language associated with the children's ethnic/cultural background, it is referred to as a heritage language. Children may learn their heritage languages first in the home, as is the case for many Mexican-American children in Texas and California, or they may be third or fourth generation immigrants who do not, as is the case for many Ukrainian children in western Canada.

Bilingual education programs are established for a number of reasons (not always clearly stated in research reports). The purpose of some programs is to guide children so that they reach as sophisticated a level of bilingualism as possible; an excellent example is the Canadian French immersion programs for English-speaking children. A goal of other programs is to help children make a more successful transition to the language and environment of the school and is often attempted by first educating the children in their heritage language; this has been tried, for example, with Aboriginal children in Australia. In some communities, bilingual programs are set up to help children maintain a heritage language that they are exposed to in their homes; programs for Cuban children in Florida are illustrative. In other communities, third, fourth and fifth generation immigrants may discover that they have become so assimilated to the dominant culture that the children are not learning their heritage language and may therefore want a bilingual program to help revitalize their language and culture; such is the case for many Ukrainians in western Canada. In some countries, the second language is a highly prestigious one, representing the language of business, higher education and upward social mobility as English is in the Philippines. In other areas, the second language is important because of the proximity and influence of another ethnic/cultural group; consider, for example, the role that the Spanish language (non-official in the United States) must play in the lives of many California Anglo children. Finally, some consider the ability to communicate in two or more languages simply a matter of being better educated while others go even further and claim that it actually promotes the growth of the intellect and mind.

The task of judging the success of a bilingual education program thus becomes a complicated matter. However, one ingredient that is essentially mandatory is that of a comparison or control group and, consequently, studies without some form of a control group have mostly not been considered for inclusion in this document. Some investigators design their studies with more than one type of control group, each used to evaluate a particular aspect of the experiment or bilingual program. Others may have access to only one type of control group and leave other portions of the design somewhat weak because of the lack of other appropriate comparison groups. Some investigators are limited because of the expense of including a comparison group while in other cases they encounter legal restrictions. A great deal of weight has been placed on the role of control groups in this document

-- the matter is repeatedly alluded to -- for it seems impossible to understand the results of any study without first having a clear picture of the nature and characteristics of the control groups. At times, researchers include control groups but fail to provide useful, explicit details.

Bilingualism is not easily defined or measured. In the studies reviewed that compare bilinguals and monolinguals, investigators identify and choose samples of bilinguals according to a number of different criteria and strategies. How bilingualism is defined influences how results are interpreted. Some use the Hoffman Bilingual Schedule (Hoffman, 1934) that requires each individual to be interviewed and consists of such questions as extent of second language usage with various members of the family, extent and language of reading matter used by members of the family, and second language social and religious functions attended by the individual and members of the family. Other researchers make use of a Word Association Test developed by Lambert (1956). The test is an association fluency technique. Words of the first and second language are presented alternately and the individuals are asked to write down as many words as they can think of in the same language that seem to "go with" or "belong with" each word. The sum of all the associations to all the first language words are calculated (NF). The same is done for the second language (NS). These two sums are then used to calculate a balance score:

$$\text{Balance} = \frac{NF - NS}{NF + NS} \times 100$$

A zero score indicates perfect balance between the two languages, a plus score means first language dominance and a minus score second language dominance. Another test developed by Lambert, Havelka and Gardner (1959) is called the Word Detection Test. In this test it is postulated that bilingualism might express itself in the facility of finding short embedded first and second language words (say, for example, English and French) in a series of letters such as DANSONODEND. Approximately equal numbers of first and second language words are embedded in each group of letters. A balance score is also calculated for this test.

Frequently, children are labelled bilinguals, but their actual areas of strength in both languages are not spelled out. Fishman, Cooper, Ma et al (1971) developed an instrument to help determine the contexts in which children are proficient in both languages. The measure calls for children to name objects commonly found in settings associated with the domains of home, education, religion, and neighborhood. The setting might be, for example, the kitchen, the school, the street, and the church.

Some researchers have subjects rate their own ability to speak, read, write and understand the second language. Others estimate the degree of bilingualism according to the number of years a student has been studying a second language. Interviews with the parents are often used as a source of information as are interviews with teachers. Experimenters may also choose to engage the individual in everyday conversation and switch back and forth between the two languages in order to determine the degree of bilingualism. Place of birth, place of residence and family names have also been used to assess children's degree of bilingualism.

The vast majority of the 110 studies reviewed involve children in kindergarten and the early elementary grades and very few of the researchers have followed the children for any more than five or six years.

This literature review has been organized for the most part according to dependent variables; that is, aspects of children's education and development that may be affected by bilingual programs and bilingualism. However, at times, independent variables become the focus of discussion.

RESEARCH LITERATURE REVIEW

Speaking

Speaking an Official First Language

Six studies have examined primary pupils' abilities to speak their official first language while educationally immersed in a second official language. Five are of Ontario and Quebec English-speaking children immersed in French and the sixth is of California English-speaking children immersed in Spanish. While immersion programs each have their own characteristics, many have been modelled after the St. Lambert French immersion program that began in Montreal during the mid-1960's and which has been briefly described as follows:

Bruck et al., 1973
Edwards &
 Casserly, 1976
Genesee, 1978(b)
Lambert &
 Tucker, 1972
Samuels et al., 1969

Cohen, 1974

> In September 1965, the South Shore Protestant Regional School Board began its first experimental French immersion classes for a group of English Canadian kindergarten pupils. Pupils attend kindergarten and grade one classes taught exclusively in French by francophone teachers. English, their mother tongue, is formally introduced for the first time in grade two. The amount of English instruction is gradually increased so that by grade five, the children are participating in an essentially bilingual program with both anglophone ahd francophone teachers.
> (Campbell et al., 1973, pp.106-7)

In evaluating speaking in these studies, children were either expected to tell stories or give descriptions in their first language, English, about stimuli such as cartoon strips and Rockwell paintings or to retell stories in English. Usually the stories were taped and sometimes transcribed for analysis. In some cases, linguists scored the stories according to detailed schemes involving counts of nouns, verbs, etc. and judgments of fluency, enunciation, rhythm, intonation, etc. In other cases, adults or adolescents scored the stories globally on 5-point or 10-point rating scales. Taken as a group, the findings suggest that middle class and (for one study) working class children in immersion programs speak their first language, English, as well as their counterparts of similar intelligence in regular programs. Lambert and Tucker summarize their findings of five years of detailed analysis as follows:

> They retell and invent short stories in English with as much comprehension and with at least as good command of rhythm, intonation, enunciation, and overall expression as the Controls. Their spontaneous productions are as long and complex and their vocabulary as rich and diverse.
> (Lambert & Tucker, 1972, p.203)

Speaking a Heritage Language

Chapman, 1982
Edmonton Public Schools, 1979
Muller et al., 1977

Several schools in Manitoba and the Edmonton Public School Board have conducted programs in the elementary grades that have divided the instruction time equally between two languages, English and Ukrainian. The subjects taught in Ukrainian in the Edmonton schools were: Ukrainian oral language arts, social studies, music, art and physical education. Children in these programs varied in their use of Ukrainian in the home. They participated in the programs to learn Ukrainian, which one must assume was a heritage language for most.

Evaluators in both settings tested the children's oral skills in Ukrainian with the Ukrainian Language Skills Test developed by the Edmonton Public School Board and found that pupils improved from year to year on the basis of pre-post testing. However, since appropriate control groups were not tested and were probably not available, no definitive statement can be made about the pupils' Ukrainian speaking skills. In fact, 64% of 14 Edmonton teachers rated the overall Ukrainian speaking skills of 22 classes of children as "poor" or "very poor".

Genesee et al., 1978

Genesee et al., (1978) describe three Montreal schools that taught English-speaking Jewish children religious and cultural subjects in Hebrew; two schools taught the remaining subjects mostly in French until grade four while the third school taught the regular subjects in English and taught French-as-a-second language. Native adult speakers of Hebrew rated tape-recorded interviews with the children on pronunciation, vocabulary, grammar and communicativeness; and, while appropriate control groups educated entirely in Hebrew were not studied, the authors seem satisfied with the Hebrew speaking skills of the children in all three schools.

Legarreta, 1979

The acquisition and maintenance of Spanish by native Spanish-speaking kindergarten children as measured by a communicative competence task has been shown to be better in a program where curriculum content and concepts are presented totally in Spanish for half the day than in a program where English-taught subject matter is immediately translated into Spanish. The first program, referred to as alternate immersion, used Spanish 50% of the time; the second program, referred to as concurrent translation, used Spanish 28% of the time. In both types of programs, the staff was bilingual and the classroom environment was bicultural. No comparisons were made with children taught completely in Spanish, as they were probably not available.

The Redwood City study of bilingual schooling for Mexican-American children in grades three to five can be described as follows: Cohen, 1975 Cohen et al., 1976

> ... teachers and aides used both Spanish and English with the children. Generally, this meant that Spanish and English were used in the same lesson, either interchangeably (word for word, phrase for phrase, sentence for sentence) or one after the other...
>
> Subjects such as math, social studies, and science were introduced bilingually, even at the outset, in keeping with the teachers' simultaneous (concurrent) uses of both Spanish and English. Although the intention was to introduce Spanish reading before English reading, in actuality the two were introduced almost simultaneously.
> (Cohen et al., 1976, pp.2-3)

Because of poor economic conditions, 60% of the project children moved away. However, of those remaining, a Spanish word naming task by domain (home, neighbourhood, school and church) and a Spanish story retelling task scored by linguists on general fluency, grammar, pronunciation, intonation, language alternation and descriptive ability indicated that the project children were not significantly better than the comparison children receiving no instruction in Spanish. Both groups of children came from low socio-economic (SES) families and had home language backgrounds that could be described as Spanish dominant or monolingual in Spanish.

Three other studies of preschool and kindergarten children described bilingual programs in schools and homes and measured speaking skills in the children's heritage languages. The first is a Toronto study of a kindergarten Italian transition program. In this program, maintaining or teaching the Italian language were not direct aims of the program; the mother tongue Chesterfield et al., 1982 Owens, 1972 Purbhoo & Shapson, 1975 was used only as a temporary bridge to aid the understanding of and instruction in English. The use of language in the classroom was described by the authors as follows:

> It turned out that standard Italian, dialect and English were all used quite freely, and translation was rarely needed to clear up misunderstandings.
>
> In the classroom, one language was never heard for long before another was used. A child might begin a thought in English, then switch to Italian if the words weren't coming fast enough, or vice versa...
>
> The teacher's use of the language depended very much on the individual she was speaking with. She might ask a question of the whole class in Italian, receive an answer in English, and then continue in English with that individual, or begin in English and change to Italian. In other words, choice of language was always spontaneous; no one was ever boxed into using one language exclusively.
> (Purbhoo & Shapson, 1975, pp.9-10)

The second is the Spanish Dame School Project in East San Jose, California that provided instruction in Spanish and English for approximately 100 children between the ages of three and six. The program is briefly described by Owens:

> Children in the preschool program spent approximately two hours a day in a home learning environment containing five children and a home tutor. Parents were actively involved in the learning activities and served as adult models for their children... In the follow-up kindergarten children received a more structured type of instruction consisting largely of small group work.
> (Owens, 1972, p.1)

And, the third involves Head Start bilingual bicultural programs in several Spanish dominant communities in the United States.

Using two teacher-rating scales, Purbhoo and Shapson found that the experimental children were better in Italian than English, but no control groups educated in Italian were available to definitively describe the speaking abilities of the Italian children in their heritage language.

Owens reported:

> In the area of oral development in Spanish ... both the three and four year old bilingual project preschool students demonstrated greater growth last year than three control groups consisting of three and four year old children from the same background not receiving any preschool instruction and a four year old group in a non-bilingual preschool group. The four year old children in the first year bilingual curriculum did better than all control groups ... The bilingual kindergarten group scored slightly higher and made somewhat greater gains in Spanish than the control kindergarten group ... Also, the second year bilingual preschool group scored higher and demonstrated a greater gain in Spanish than did the bilingual kindergarten children. This was probably influenced by the larger percentage of dominant Spanish-speaking children in the preschool class than in the kindergarten class and the heavier emphasis placed upon oral development in Spanish in the preschool curriculum.
> (Owens, 1972, p.5)

The Spanish-speaking children in the Head Start bilingual programs made significantly better pre-post gains in story telling in Spanish than the Spanish-speaking children in the regular Head Start programs. (The two groups of children were equivalent on the basis of language preference, age, sex, and any prior preschool experience.)

Speaking a Non-official, Non-heritage Second Language

Cohen, 1974

Few elementary school programs have been designed to teach children in the medium of a second language which is neither an official language nor a heritage language. One such program found in the literature was the Culver City Spanish Immersion Program that instructed English-speaking children in Spanish. The ability of the children to speak Spanish after two years in the program was examined through a story telling task. No comparison group was available, so the investigators compared these children's Spanish-speaking skills with their English-speaking skills and concluded:

> The ratios of different nouns to total nouns and different verbs to total verbs were somewhat lower than those for English, but still showed a certain amount of vocabulary range. ... the children were not at a loss for words in Spanish. They were able to communicate a story to a reasonable extent.
> (Cohen, 1974, p.100)

Speaking an Official Second Language

Canada has two official languages, English and French. Many schools across Canada are now involved with early or late French immersion programs for English-speaking children. Several studies have measured how well these children learn to speak French; some have compared the results to results from programs that teach French-as-a-second language (say 20 minutes a day) or that also teach another subject in French (for a total of, say, 75 minutes a day), while others have used Quebec French-speaking children being educated in French as controls.

Using techniques such as taping children's interviews and story telling, numerous aspects of French-speaking skills have been assessed and reported in these six papers and compared with English-speaking controls in the 20 to 75 minute programs. The investigators found that, in general, students in the immersion programs score higher.

Edwards & Casserly, 1976
Genesee, 1976
Genesee et al., 1977
Genesee et al., 1978
Swain & Lapkin, 1977
Tucker et al., 1976

The Protestant School Board of Greater Montreal and the South Shore Protestant Regional School Board in a suburb of Montreal have easy access to native French-speaking children and have thus been able to judge the success of French-immersion programs in a more rigorous manner. Studies in the South Shore Board done within the St. Lambert project (see page 5) suggest that grade two pupils who had been instructed exclusively in French since kindergarten were as competent in speaking as native speakers of French. As the children grew older and remained in the immersion programs, they were reported to continue to speak French well, although not quite native-like:

Bruck et al., 1974
Genesee et al., 1977
Genesee, 1978(b)
Lambert & Tucker, 1974
Samuels et al., 1969
Spilka, 1978

> Non-native children enrolled in immersion classes could indeed express themselves in their second language as evidenced by the fact that their stories were always readily intelligible to a native speaker of French. However, they did not perform as well as native children on a number of measures. Their rate of production remained slower, even after seven years of schooling in the second language; their ability to handle complex sentences was not equal to French children's, at least as shown by their failure to use as many sentential objects; they were, however, as flexible as native children by the time they reached Grade Six.
> (Spilka, 1978, p.548)

And, Genesee's work in the Protestant School Board essentially comes to the same conclusions. Genesee also studied the effects of I.Q. and wrote:

> ... acquisition of interpersonal communication skills in French under the circumstances of French immersion does not seem to depend upon the students' I.Q. level. This finding is consistent with the philosophy of French immersion that we all have the inherent cognitive abilities to learn language, provided it is used as a vehicle of meaningful communication.
> (Genesee et al., 1977, p.330)

The Republic of the Philippines has three official languages -- English, Spanish and Pilipino, popularly referred to as Tagalog. In 1968, an experiment with an English/Pilipino bilingual alternate days approach was begun with children who were native speakers of Pilipino. The method of instruction was as follows:

Tucker et al, 1970

> ... all subjects except Language Arts were taught on Day 1 using Pilipino as the medium of instruction; on Day 2 using English; Day 3, Pilipino; Day 4, English; etc. The material covered on Day 2 was not simply a repetition of that covered on Day 1; but was instead a continuation of the previous day's lesson.
> (Tucker et al., 1970, p.284)

Tucker and his colleagues report that after one year the children in the program were doing the same in speaking English as similar children educated in a standard English curriculum and a standard Pilipino curriculum, both of which had English and ESL classes totalling 80 minutes a day. Therefore, the alternate days approach seemed to add little to English-speaking skills over the standard approaches. The authors do not comment about the influence of English in the homes and community, but the influence may be such that a different educational approach made no difference in English-speaking skills.

Altena &
Appel, 1982
Gale et al., 1981
Wijnstra, 1980

The matter of learning a second official language when one's first language is not official and when one belongs to a minority group presents a different set of circumstances from those discussed above. Such children, for example, Spanish-speaking children in the United States, were traditionally expected to transfer to the second language immediately upon entering school and were often punished for using their first language. Within the past decade or two, this approach has come under considerable criticism with the consequence that various forms of bilingual education are being attempted throughout the world. Here are three illustrations, two from Holland and one from Australia that make extensive use of the child's first language in the beginning years:

> In many schools in cities in the Western part of Holland more than half of the children have a non-Dutch ethnic background, in some schools even more than 80%. ...
>
> Owing to certain negative experiences, ... an experimental school for foreign children was started in the city of Leyden in October 1977. ... Moroccan and Turkish children of the 6-12 age group who had arrived directly from their respective countries of origin were given the opportunity to attend a school with classes which were specially organised for them. These classes were associated with a 'regular' Dutch school. The children were instructed in all subjects in the native language by teachers from their country of origin. For about one hour every day, Dutch was the subject (as well as the medium) of instruction in lessons given by a Dutch teacher. ... In the second

> year, school subjects were taught about half the time in the mother tongue of the children, and half the time in Dutch. After two years, the foreign children went to 'regular' schools in their neighbourhood.
> (Altena & Appel, 1982, pp.316-7)

> Up till 1937 Dutch was the only officially allowed medium of instruction in Holland ... from 1937 the subject 'language' might comprise Frisian as well. ... After World War II this discussion was resumed and in 1950 an important experiment was set up in nine schools. In these schools Frisian became the medium of instruction in the first two grades. As early as 1955 the model was legalized, i.e. it became legally possible to use Frisian (or another regional language) as a medium of instruction in the first three grades. ...
>
> In 1955, when the bilingual schools were made possible, approximately two-thirds of the primary school pupils in the province (then about 500,000 inhabitants) came from families with Frisian as home language. This proportion has not changed significantly since. The Frisian-speaking population is concentrated in the countryside, however, and in 1956 there were 26 municipalities in which the number of Frisian-speaking families was over 90% ...
>
> As from 1975 the use of Frisian as a medium of instruction is no longer restricted to the first three grades...
> (Wijnstra, 1980, pp.46-7)

> Culturally and linguistically, the Aboriginal people of Milingimbi form a relatively homogeneous group, speaking Gupapuyngu and its closely related counterpart, Djambarrpuyngu. ... The bilingual program was introduced to the Preschool and Year 1 in 1973. ...

> Overall, during their Primary school years, students received about half their schooling in their Aboriginal language and half in English, although proportions varied as the children progressed through the school. A trained non-Aboriginal teacher taught the English parts of the program and a partially trained or untrained Aboriginal teacher taught the Aboriginal language portions of the program.
> (Gale et al., 1981, pp.297-9)

In these three experiments, researchers, using in one case a complex linguistic analysis of children's conversations as well as language tests, in another an analysis of quantitative fluency, and in the third oral Dutch discrete-point tests and analysis of spontaneous oral language, found that the ability of the children to speak the second language was better or equal to similar children in more traditional Dutch and English programs.

In the case of the study of Frisian children, comparisons were also made with native Dutch-speaking children. The results showed that the Frisian children could not match the speaking skills of the Dutch children but that the discrepancies were decreasing over time:

> Obviously the spontaneous language use of the Frisian children is not always as fluent as that of the Utrecht children, nor is their Dutch always correct and current. This is shown up by a sometimes unusual choice of words and by the use of superfluous or unusual adverbs and prepositions. These deviations from current Dutch (roughly 12 per 1000 words) hardly interfere with comprehensibility, however.
> (Wijnstra, 1980, p.51)

Gale and her colleagues suggested the following reason for their positive results:

> To perform well on a task such as the Story Retelling test, the children needed practice in the skills of story analysis, retention, and oral production. In the bilingual classes the children

> had the opportunity from an early age to practice these skills in their own language; then, in their regular oral English sessions, they were able to transfer skills of expression to English. On the other hand, the children from the English-only classes had had plenty of exposure to English but because they still knew relatively little English vocabulary they had had little practice at story analysis and production. What practice they had had in English was probably too foreign to benefit them greatly.
> (Gale et al., 1981, p.304)

Three American experiments (see pages 6 and 8) in bilingual education for Spanish-speaking children came to similar conclusions.

Chesterfield, 1982
Legarreta, 1979
Owens, 1972

Other bilingual programs use translation methods that make use of the child's first language simultaneously while learning or not understanding the second language. The results from these experiments with respect to speaking the second language are mixed. The experiments for Spanish and Italian children are described on pages 7 and 8. The third experiment is of Punjabi primary children in Vancouver:

Cohen, 1975
Cohen et al., 1976
Moody, 1974
Purbhoo &
Shapson, 1975

> The teacher of the experimental program used Punjabi when she felt a child was not comprehending what she was saying to him in English. Rather than providing him with a direct translation, however, she attempted to equate the English to the Punjabi through explanation and gesture, thereby supplying him with comprehension as well as vocabulary. ... The classroom was replete with equipment to stimulate language development, including such things as a Language Master and a listening post. The teacher made a concentrated effort to present new material using a multi-sensory approach, and she stressed rote learning. The buddy system (a Caucasian child from a regular class paired with an East Indian child was an integral part of their program as well.
> (Moody, 1974, p.17)

Summary

A total of twenty-seven papers measuring speaking have been discussed in this section. The following themes are suggested:

1. A child whose first language is an official one, who is a member of a majority group and who is likely of the middle class may be completely immersed in a second language with no detrimental effects with respect to speaking the first. (An example is English-speaking Ottawa children learning French.)

2. A child whose first language is non-official, who is a member of a minority group and who is of low socio-economic status may do best in learning to speak a second language if education is begun in the first. (An example is Aboriginal children learning English in Australia.)

3. A child in an immersion program of a second official language learns to speak the second language better than if enrolled in a traditional language program that teaches the second language as a subject for about 20 minutes a day, but the child may not reach native-like proficiency. Such a child usually has minimal exposure to the second language in the home and community. (An example is English-speaking Toronto children learning French.) When the child has more exposure to the second language in the home and community, the amount of school exposure may be less important in terms of speaking skills. (An example is Pilipino-speaking children learning English in the Philippines.)

4. A child may be taught a heritage language in a regular school system by using it as a medium of instruction and may be shown to be making progress in speaking that language. However, definitive statements about speaking proficiency are difficult to make due to the lack of native-speaking controls educated in that language. (An example is Edmonton children whose heritage language is Ukrainian.) If the child has extensive exposure to the heritage language in the home and community the impact of a bilingual program on speaking skills may be moderated. (An example is Redwood City, California children whose heritage language is Spanish.)

5. Measures of I.Q. may not be related to speaking skills.

Listening

Listening in an Official First Language

The Ontario and Quebec educators have shown concern over elementary children's ability to accurately listen to their first language, English, when they have been immersed in a second language, French, with little or no formal instruction in English. These eight papers report research resulting from this concern.

Barik &
Swain, 1975
Bruck et al, 1973
Bruck et al, 1974
Genesee, 1978(b)
Genesee et al, 1978
Lambert &
Tucker, 1972
Oliver et al, 1976
Samuels et al, 1969

Listening is measured by having the children match an orally presented word with ones presented on a screen or in a book as done in the Peabody Picture Vocabulary Test and the word discrimination section of the Metropolitan Achievement Tests; by having the children answer "yes-no" questions after listening to tape-recorded text; or by a combination of these:

> Each child was given two twelve-page booklets; one containing sets of six abstract designs; the other, six photographs of a woman's face. The designs of each set were very similar except for subtle variations in lighting or details. The children listened to a series of twenty-four tape-recorded descriptions, and selected from their booklets the one design or photograph being described. Two tapes were used, one with child speakers and one with adult speakers.
> (Lambert & Tucker, 1972, p.73)

Taking the papers as a group, the conclusion is that English-speaking children immersed in French have listening skills in English equal to those of children mostly with similar I.Q. and SES levels but in regular English school programs. The few significant differences that were found favored the control groups.

Listening in a Heritage Language

Investigators of the 50-50 English-Ukrainian bilingual elementary programs in Manitoba and Edmonton (see description on page 6) have considered whether the children learn to listen in their heritage language, Ukrainian, as a result of such bilingual education. Tests of listening showed the students usually improved from year to year and obtained acceptable scores, although the lack of control groups places limitations on the conclusions that can be made. The teachers in Edmonton felt the children did better in listening than

Chapman, 1982
Edmonton Public
Schools, 1979
Muller et al, 1977

in speaking Ukrainian -- 71% of 14 teachers rated the overall ability of 22 classes of children to listen and comprehend in Ukrainian as "well" or "very well".

These Ukrainian children are likely to be third and fourth generation; Spanish and Italian children in other studies are likely to be first and second generation, with the consequence that Ukrainian children are less likely to be listening to their heritage language at home than the Spanish and Italian children. Four studies of Spanish and Italian children have investigated the effect of bilingual programs on heritage language listening skills and concluded that the bilingual programs had no effect. This lack of program effect could be due to the fact that both the control children and the program children have so much experience in listening to their heritage language at home and in the community that the extra experience the program children get at school adds little.

Chesterfield, 1982
Cohen, 1975
Legarreta, 1979
Purbhoo &
Shapson, 1975

While considering these points, it is interesting to note that another American study of Spanish preschool and kindergarten children (see page 8) reports that on the basis of several tests the children in the program demonstrated greater growth in their listening skills in Spanish than control children not participating. However, caution must be exercised in interpreting this study, because even though the control children were of the same ethnic and socio-economic background, they initially used substantially more English and less Spanish than the program children.

Owens, 1972

Genesee et al. found that with similar numbers of hours and kinds of subjects in Hebrew instruction (see page 6), grade four children were able to listen as well in Hebrew in a trilingual program (Hebrew, French and English) as in a bilingual program (Hebrew and English). The grade two children in the trilingual programs were even significantly better. Thus it seems possible that children can learn to listen in a heritage language while studying two other languages.

Genesee et al., 1978

Listening in an Official Second Language

Numerous Canadian studies of French immersion programs have examined the degree to which English-speaking children in these programs learn to listen in the second official language, French. One group of studies on early and late immersion programs conducted mostly in the Montreal area have been able to compare the French listening skills of these children to those of French born and educated children of the same age, frequently matched on I.Q. and SES. The results have shown that the immersion children approach

Bruck et al., 1973
Bruck et al., 1974
Bruck et al., 1975
Genesee et al., 1977
Genesee et al., 1978
Lambert &
Tucker, 1972
Samuels et al., 1969
Swain et al., 1981

native-like proficiency in listening in French and in some cases (see, for example, Samuels et al., 1969) attain equivalent proficiency.

A second group of studies have compared the French listening skills of immersion children to those of children taking French-as-a-second language (FSL). The results of these studies consistently show that children at all grade levels in both early and late immersion programs are more proficient in French listening than those in FSL programs.

Barik & Swain, 1975
Genesee, 1976
Shapson & Day, 1982
Swain & Lapkin, 1977
Tucker et al., 1970

A third group of studies, mostly conducted in Ontario where French born and educated children are not readily available for comparisons, have used results and norms of other French immersion programs for evaluation purposes. In most cases, the comparisons have been favorable. There is also a suggestion in three of these studies that the more immersed the children are in French in the school and the community, the better their French-listening skills will be.

Andrew et al., 1980
Barik et al., 1977
Crawford, 1984
Genesee, 1978(b)
Lapkin et al., 1981
Oliver et al., 1976

Tucker et al., in their study of the English/Pilipino bilingual program described on page 11, found, as they did for speaking, no differences by program in English-listening. The study gave no indication of how the children might compare with English born and educated children.

Tucker et al., 1970

What about children of a minority group whose first language is not official? Several investigators have tested minority group children in bilingual programs to determine how well they listen in the official, second language. The bilingual programs vary but include home bilingual tutorials, concurrent or simultaneous translation, alternate day bilingual programs and 50-50 programs. The children's first languages include Spanish, Punjabi, Italian, Finnish, Ukrainian, Frisian, and Gupapuyngu. The control children are similar and are usually being schooled mostly in the official language. The results show that these children learn to listen in the official second language as well as, or better, in the bilingual programs as they do in the regular programs. Unfortunately, with few exceptions, no comparisons were made with children whose native and school language was the official language. One investigator, Moody, who made such a comparison reported that both the experimental and control Punjabi children did poorly in auditory discrimination when compared with Caucasian children. Another investigator, Wijnstra, wrote that the Frisian children were slightly poorer than the province of Utrecht group born and educated in Dutch in grade one but were improving by grades two and three. Descriptions of most of these programs are supplied on pages 6, 7, 8, 13 and 15.

Chapman, 1982
Chesterfield, 1982
Cohen, 1975
Gale et al, 1981
Legarreta, 1979
Moody, 1974
Owens, 1972
Purbhoo & Shapson, 1975
Skutnabb-Kangas, 1979
Wijnstra, 1980

Genesee has studied the relationship of I.Q. measures to listening skills and concluded that the two are not related.

Genesee, 1976
Genesee et al., 1977

Summary

The following six points arise from the studies reviewed in this section on listening:

1. Children whose first language is an official one and who use that language in the home and community will maintain their listening skills in that language while educationally immersed in a second language. (An example is English-speaking children in Toronto immersed in French.)

2. When children listen to a heritage language at home, bilingual schooling may do little to improve their listening skills in their heritage language. (An example is Spanish-speaking children in California.)

3. When children do not hear their heritage language so much at home, bilingual schooling may improve their listening skills in their heritage language. (An example is Ukrainian children in Edmonton.)

4. Children in an immersion program of a second official language learn to listen in the second language better than if enrolled in a traditional program that teaches the second language as a subject for about 20 minutes a day; they may even reach native-like proficiency. Such children usually have minimal exposure to the second language in the home and community. (An example is English-speaking Toronto children learning French.) When the children have exposure to the second language in the home and community, the amount of school exposure may be less important in terms of listening skills (An example is Pilipino-speaking children learning English in the Philippines.)

5. Children of minority groups whose first language is not official can learn to listen to an official second language in bilingual programs as well as or better than in official-language-only programs. However, the degree to which these children approach native-like proficiency is rarely measured. (An example is Spanish children learning English in the United States.)

6. Measures of I.Q. may not be related to listening skill.

Writing and Language Skills

Writing and Language Skills in an Official First Language

Assessing the effects on writing and language skills in the official first language, English, of learning through a second language in the early years of schooling has been a central focus of research on Canadian French immersion programs. Three methods of assessing the English writing and language skills have been used. The most commonly used method has been that of standardized tests; the second, the evaluation of compositions; and the third, the cloze procedure.

Twelve investigations have used subtests of language skills from the Canadian Tests of Basic Skills (CTBS) and/or the Metropolitan Achievement Test (MAT) that test spelling, punctuation, capitalization, vocabulary and usage. These researchers have tested the French-immersion children at various elementary grade levels and in the majority of cases compared the results with children in regular English programs with or without FSL and of similar I.Q. and socio-economic levels. The results are quite consistent, indicating that French-immersion children experience initial lags in the English skills measured by these tests up to the grade three level, after which the trends are reversed and immersion students perform as well as or outperform students in regular English programs. This is a logical finding, since most French immersion programs gradually decrease the time spent in French and increase the time spent in English with each new grade level.

Andrew et al., 1980
Barik & Swain, 1975
Barik & Swain, 1978
Barik et al., 1977
Bruck et al., 1973
Bruck et al., 1974
Bruck et al., 1975
Crawford, 1984
Edwards & Casserly, 1976
Lapkin et al., 1981
Shapson & Day, 1982
Swain et al., 1981

Some investigators of French immersion programs have had students (above grade two) write compositions, stories or letters and then conducted detailed technical analyses of the writing. The Genesee investigations scored written compositions on nine dimensions: spelling, sentence accuracy, sentence complexity and variety, organization, originality, length, punctuation, vocabulary and overall impression. Swain qualitatively studied vocabulary (variety and errors), technical skills (punctuation, capitalization and spelling), grammar (types of sentences and syntactic errors) and creativity. In addition to technical analyses, two researchers, Crawford and Lapkin also rated the compositions holistically. While the details and results of these studies vary somewhat, the overall conclusion is that immersion students write as well as students in regular English programs. Genesee and Stanley concluded:

Bruck et al., 1974
Crawford, 1984
Genesee, 1978(b)
Genesee & Stanley, 1976
Genesee et al., 1977
Genesee et al., 1978
Lapkin, 1982
Swain, 1979

> These findings suggest that the immersion students had no difficulty expressing themselves in

> written form. In no case did an immersion group score lower than a nonimmersion group on organization, originality, or overall; on the contrary, the immersion students in particular grades scored higher than the nonimmersion students on each of these dimensions. It appears, at least intuitively, that organization, originality, and overall expression are basic prerequisites for effective expression. Besides these basic skills, effective expression ultimately requires proficiency in linguistic skills related to sentence structure, vocabulary and punctuation. Again, the immersion students performed as well as the nonimmersion students in these areas. Therefore, the immersion students seemed to be at least as well equipped as the nonimmersion students to express themselves in written English.
> (Genesee & Stanley, 1976, p.15)

The English Story Completion Test is a third strategy used by French immersion researchers for providing a measure of overall English language proficiency. It is a cloze procedure test that consists of passages of prose in which the first and last paragraphs or sentences are left intact and every seventh word is deleted from the body of the passages, to be completed by the students. The few researchers who have used this test in grades three through eight have found no significant differences between immersion students and regular program students.

Andrew et al., 1980
Barik & Swain, 1978
Carey & Cummins, 1983
Lapkin et al., 1981
Swain et al., 1981

The Edmonton French immersion program studied by Carey and Cummins is somewhat different from other Canadian immersion programs in that the children enrolled are both Anglophones and Francophones and are instructed in the medium of French for 80% of the school day. This meant that the official first language, French, of the Francophone students could be examined. A French cloze test indicated that they scored the same as Franco-Ontario students who attended separate Francophone schools but lower than Quebec Francophone groups.

Macnamara reported results similar to these Canadian French immersion studies after an extensive study of English-speaking Irish children. Five groups of fifth standard children were involved: group one was taught all subjects in English in all classes; group two was taught arithmetic in Irish as infants only;

Macnamara, 1966

group three was taught arithmetic in Irish as infants and first standard only; group four was taught arithmetic in Irish as infants to third standard; and group five was taught all subjects in Irish in all classes. Using the Moray House English Test 14 (MHE 14) that includes tests of spelling, punctuation, vocabulary, capitalization, the formation of adjectives from nouns and syntax, he found that the five groups did not differ significantly in mean English quotient. Therefore, Irish children did the same in their official first language when educated entirely in Irish, bilingually in Irish and English or entirely in English. Macnamara, however, went a step further than the French immersion researchers and compared the Irish children to British primary school children and found that all five groups of Irish children performed more poorly on the MHE 14. Then, after devoting several pages to a discussion of why the MHE 14 may be more suitable for British children than Irish children, he concludes by saying the finding is a grave matter and questions the general policy for the restoration of the Irish language.

Chapman, 1982
Ewanyshyn, 1980

The bilingual Ukrainian/English programs in Manitoba and Edmonton may also be included in this section (see description on page 6). Use of school system tests of spelling and the CTBS indicated that bilingually educated children performed as well in English as similar children in regular English programs. Caution must be exercised in interpreting these results, however, since the authors do not report whether the children first spoke English at home.

Gaardner &
Richardson, 1968

And, finally, the results of an American study in Florida also corroborate the French-immersion findings. In the early 1960's, Coral Way elementary school in Florida became a complete "two-way bilingual school" in a middle-class community in which there were about equal numbers of monolingual English-speaking American children and Spanish-speaking Cuban refugee children. The ambitious purpose at Coral Way was to teach both groups of children to understand, speak, read, and write a second language and to learn through both English and Spanish. Gaardner and Richardson describe the program as follows:

> In Dade County there is a high concentration of literate Cuban refugees who have a vigorous culture of their own. Many residents of the South Florida area have a sympathetic attitude toward these Spanish-speaking people. This attitude was particularly strong in 1963 when the bilingual school was getting under way.
> (Gaardner & Richardson, 1968, p.38)

> The teachers at each grade level were paired in teams consisting of one native speaker of English and one native speaker of Spanish. The English-speaking teacher of each team was responsible for the academic instruction in English of one group of native English-speaking pupils and one group of native Spanish-speaking pupils. The Spanish-speaking teacher was responsible for the instruction in Spanish of the same two groups of pupils. Three bilingual aides, former teachers in Cuba, assisted in the music, art, and physical education programs. They were free to use either language in their classes. ...
>
> Pupils in the experimental bilingual program were taught for approximately half the day through English and half the day through Spanish. Normally all new concepts were first presented in the native language in the morning, then reinforced in the second language in the afternoon.
> (Gaardner & Richardson, 1968, pp.36-7)

Using the English version of the Cooperative Inter-American Reading Tests, the investigators found that the English-speaking American children in this program could spell as well as corresponding children studying the regular curriculum in the monolingual control school.

Language Skills in a Non-official, Non-heritage Second Language

Gaardner &
Richardson, 1968

Children in bilingual programs are usually not ones learning a non-official, non-heritage second language. However, the English-speaking American children in the "two-way bilingual school" described in the preceding section were learning Spanish. Using the Spanish version of the Cooperative Inter-American Reading Tests, the investigators found that these children were making good progress toward learning to spell in Spanish, although the lack of a Spanish born and educated control group makes it difficult to say just how good that progress was. The authors state that after four years, the children still achieved better through English than through Spanish, but that the differences were decreasing year by year.

Writing and Language Skills in a Heritage Language

Gaardner & Richardson, 1968

The Coral Way study (see above) is again pertinent, but in this instance the focus is on Cuban children and their heritage language, Spanish. The premise was that the Cuban children would maintain or further their skills in their native language while at the same time learning English. The investigators reported the children performed the same in Spanish as those in regular English programs. They did not compare the children with Cuban born and Spanish educated children, so it is impossible to say exactly how well they were achieving in Spanish. The variable tested and of interest in this section was that of "spelling".

Cohen, 1975

Cohen also seemed satisfied with the Spanish writing skills of Mexican-American grade three children in a bilingual program in California (see description on page 7). He had the children write a story in Spanish as suggested by a sequence of twelve pictures and then scored them on seven dimensions: verbal output, range of vocabulary, diversity of vocabulary, accuracy of spelling, grammatical correctness, quality of sentence structure and effectiveness of expression. However, he based his conclusions on a limited number of select Mexican-American control children being educated in a nearby school receiving conventional English-only education and not on Mexican born and Spanish educated control children.

Edmonton Public Schools, 1979
Chapman, 1982
Ewanyshyn, 1980

The studies of English/Ukrainian bilingual programs in Edmonton and Manitoba using the Ukrainian Language Tests developed by the Edmonton Public School Board showed that the elementary children were beginning to develop Ukrainian writing skills at grade three and made significant improvements from year to year. No control groups of any kind were studied, and the Edmonton teachers were more likely to rate the children as doing "very poorly" or "poorly" in writing than "very well" or "well".

Löfgren & Ouvinen-Birgerstam, 1982

The Department of Education in Lund, Sweden evaluated an elementary bilingual program for Finnish children in which they attended a Finnish-speaking pre-school for two years followed by an elementary school where they were taught in both Finnish and Swedish with reading and writing first introduced in Finnish:

> The teaching group for a work team comprised two Swedish class teachers, who were responsible for a parallel class each, a Finnish teacher, who was in charge of Finnish teaching, and an immigrant teacher to teach the immigrant

> children Swedish. In addition to these teachers, certain pupils had access to remedial teachers on the normal basis and -- in the case of non-Finnish immigrant pupils -- to home language teachers. This teacher density does not deviate from the normal resource allocation in schools. The only deviation which occurred was that the home language practice periods for all the Finnish immigrant pupils were run together and the children were assembled in a single group and allotted their own Finnish teacher and an extra classroom for their Finnish periods.
> (Löfgren and Ouvinen-Birgerstam, 1982, p.324)

As in the preceding studies, the investigators concluded that the children made improvements in writing their heritage language, Finnish, but they also compared the results with norms for Finnish children in Finland and wrote:

> The project children's command of their first language, both at pre-school level and in Grades 1-4 of elementary school, is roughly one S.D. below the average for single-language Finnish children in Finland. It should be pointed out that the curriculum and time allocation at junior level are not the same in Finland and Sweden, which somewhat impedes direct comparisons of school achievements between the two countries.
>
> An investigation of the development of the project children's level of proficiency in Finnish from year to year reveals that they have retained approximately the same relative level compared to children of the same age in Finland. This means that their knowledge of their first language has developed all the time. It is true that their average level of proficiency is lower than that of the norm group

> 'Finnish children in Finland', but their development proceeds at a normal speed.
> (Lofgren & Ouvinen-Birgerstam, 1982, p.326)

On the other hand, these Finnish children were shown to be better in Finnish language skills than similar Finnish children in Swedish-only classes. This result can be interpreted to mean that the children in the Swedish-only classes were not able to maintain their Finnish as well as those studying the language at school. Such was not the case for Cuban children in Florida whose Spanish spelling was as good in English-only classes as in the bilingual classes. This difference may be attributable to very dissimilar social and family conditions. In contrast to the Cubans in Florida (see page 23),

Skutnabb-Kangas & Toukomaa, 1976

> The Finns' own identity does not get support or acceptance from the majority. The minority status is low. Unfavourable stereotyped ideas and prejudices are felt about the members of the minority. ...
>
> They attempt to conceal their ethnic origin, which is felt to be inferior. ... They try to avoid verbal communication so as not to reveal their stigmatized identity.
> (Skutnabb-Kangas and Toukomaa, 1976, p.35)
>
> The parents are often both on shift work, and work so hard that they do not have time or energy to spend with the children. ... this small amount of communication between the generations is particularly detrimental for the linguistic development of migrant children. To this we must add the communication and socialization models of the social group: in a working class milieu, language may be used for informative, personal and interpersonal functions less than in the middle class. ... Often the parents are not aware of the importance of their own role in the development of the children's mother tongue, especially in migrant conditions. ...

> Because of the Finns' silent sub-culture ... one does not even hear as much Finnish as the number of Finns would suggest, on the street, in public transport and in other public places.
> (Skutnabb-Kangas and Toukomaa, 1976, pp.39-40)

Writing and Language Arts in an Official Second Language

The Canadian researchers of French immersion have frequently chosen the Test de Rendement en Français to evaluate how successfully the English-speaking children learn the official second language, French. It is a series of tests of achievement in French used by the Commission des Écoles Catholiques de Montréal and by the Ministry of Education in Quebec with native French-speaking students. (The grade three test, for example, involves such topics as synonyms, antonyms, rearranging words into a sentence, alphabetical sequences, tenses and stylistics.) Raw total scores have usually been referred to stanine norms established for native French speakers in Montreal and have shown on the average that the children's French language skills develop from year to year in immersion programs but are not quite as sophisticated at any particular grade level as native speakers of French. Their scores usually fall within the third, fourth and fifth stanines. The studies also show that children develop better French language skills in immersion programs than they do in regular programs that teach French-as-a-second language (FSL), even when the immersion programs are begun late in elementary school or in high school.

Andrew et al., 1980
Barik & Swain, 1975
Barik & Swain, 1978
Bruck et al., 1973
Crawford, 1984
Genesee, 1976
Genesee et al., 1978
Lapkin et al., 1981
Shapson & Day, 1982
Shapson & Kaufman, 1978
Swain et al., 1981
Tucker et al., 1976

The Test de mots à trouver is a cloze procedure test (similar to the English cloze test discussed on page 22) that provides an overall measure of French language proficiency. Administrations of this test to French immersion Anglophone students at or above grade five also indicate that the students learn French language skills but do not do quite as well as native French children. Early immersion students do better than late immersion students.

Andrew et al., 1980
Carey & Cummins, 1983
Lapkin et al., 1981
Swain & Lapkin, 1977
Swain et al., 1981

The study of French immersion in Edmonton (see page 22) included an English cloze test (the second official language) for the French children enrolled in the immersion program and concluded that they did as well as English speaking control children in Ontario. The dominant English environment of these children must therefore have some influence on their language skills even though their school program is 80% French.

Analyses of compositions written in French and English by grade three and grade eight French immersion students have indicated that the students write better in English:

Crawford, 1984
Bruck et al., 1975
Swain, 1979

> The written English language skills of the grade eight Immersion pupils appear to be superior to their written French language skills. A comparison between the compositions written in French and English reveals that those written in French:
>
> 1) were rated as being of a slightly poorer quality in terms of creativity and sophistication of thought and written expression
>
> 2) were shorter in length
>
> 3) contained a greater proportion of vocabulary, syntax and spelling errors, as well as errors related to the use of adjectives, articles and prepositions/adverbs/pronouns
>
> 4) contained a greater proportion of simple and compound sentences
>
> There was, however, a greater variety in the use of nouns in the French compositions (the variety in the use of verbs was the same for both the English and French compositions) and fewer errors related to capitalization and punctuation.
>
> These results indicate that despite being enrolled in the French Immersion program, the written English language skills of the pupils are superior to their written French language skills. Many of the errors made in the French compositions were, in fact, due to a confusion with English. (Crawford, 1984, p.21)

The St. Lambert French immersion students at grade eight, however, were found to write about the same in French as French control children, although Bruck et al. felt that both groups wrote very poorly.

A study by Popp somewhat supports what Carey and Cummins found for the French students in a French immersion program in Edmonton (see pages 22 and 28). Popp studied the complete system of bilingual education (French and English) for French-speaking students in the Niagara South Board of Education. The setting is described as follows: Popp, 1976

> Within the Niagara South system, one family of schools provides a bilingual program. It consists of three junior elementary schools with 900 students, one intermediate (Grades Seven and Eight) school with 300 students, and one secondary school with 800 students.
>
> All verbal interaction from Kindergarten to Grade Two is in French. Beginning in Grade Three, English reading is introduced, and English is pursued as a subject of study to the end of the secondary school program. From Grade Seven, English is employed as the language of instruction part of the time in Mathematics and Science, and at the secondary level, 50% of the subjects are presented in English. Otherwise, a major goal of the schools is to encourage the use of French rather than English on the assumption that the students make sufficient use of English in the community at large.
> (Popp, 1976, pp.365-6)

Using the Co-operative English Tests (CET), Popp reported that the French-speaking children in this bilingual program did as well as English born and educated students in the mechanics of English but less well in English effectiveness.

One other research work deals with the abilities of children, who know one official language, in a second official language in a bilingual educational setting. Macnamara studied the Irish language skills of English-speaking children in English-speaking districts in Ireland (see page 22) and found that the more Irish was used as a medium of instruction, the better the Irish language skills, but that the skills never matched those of Irish-speaking and educated children living in a primarily Irish-speaking district. Macnamara, 1966

A remaining seven papers focus on the writing and language skills in an official second language for children who are definitely minority groups and whose first language is not official. These are the Cuban and Mexican children in America, the Finnish children in Sweden, the Frisian, Turkish and Moroccan children in Holland and the Aboriginal children in Australia. One of the assumptions behind the bilingual programs set up for these children (see descriptions on pages 7, 12, 13, 23 and 25) is that children need to begin education in their first language in order to succeed in the official second language. Using standardized tests, cloze tests and/or ratings of compositions, the writing and/or language skills were compared to similar children in regular official language programs. Only Wijnstra and Löfgren and Ouvinen-Birgerstam compared the results to children born and educated in the official language. The results are somewhat contradictory, although six investigators conclude that the bilingual children do no worse in the official second language than similar children educated entirely in the second language. Two investigations (Altena and Appel, Gale et al.) suggest the bilingual children do better while one investigation (Moore and Parr) suggests they do not do as well. The Swedish study found that the Finnish children in the bilingual program were one standard deviation below the normative average for Swedish children of the same age. The Frisian study, on the other hand, found little difference in Dutch composition writing between the Frisian children and Dutch children from Utrecht. The lack of such comparisons in the other studies makes it impossible to accurately judge the abilities of the children in the official second language. This is unfortunate, since obviously control groups of children born and educated in the official language were available.

Altena & Appel, 1982
Cohen, 1975
Gaardner & Richardson, 1968
Gale et al., 1981
Löfgren & Ouvinen-Birgerstam, 1982
Moore & Parr, 1978
Wijnstra, 1980

Bilingual Children in Monolingual Programs

Two investigations considered the language backgrounds of children enrolled in monolingual English educational systems. Bilingual and monolingual children were compared on English essay writing in one study and language skills (vocabulary, spelling, capitalization, punctuation and usage) in the other. The results were mixed.

Lewis & Lewis, 1965
Tsushima & Hogan, 1975

Summary

Several general observations can be drawn from the review of writing and language skills examined in these twenty-seven investigations:

1. Children whose first language is official and who are exposed to the language in many aspects of daily life learn writing and language skills in that language while in bilingual education programs as well as students in the same geographic area educated in a regular first

language monolingual program. (An example is English-speaking children in English/Irish bilingual programs in Ireland.) Students in total immersion programs may experience lags in the first years.

2. Children can make progress in writing and language skills in a non-official, non-heritage second language in a bilingual program while maintaining their first official language writing and language skills. (An example is English-speaking children in Florida learning Spanish.)

3. Third and fourth generation children of minority groups can make progress in writing and language skills in their heritage language while in bilingual programs. However, it is difficult to say just how much progress they make, since few investigators have used control groups born and educated in that language. (An example is Ukrainian children in Edmonton.)

4. Children whose first language is official can make good progress in writing and language skills in a second official language. Their skills, however, tend not to be as good as their first language skills, nor quite as good as children born and educated in that second, official language. (An example is English-speaking children in Toronto learning French.) The more immersed the children are in the second language in school and community, the better their skills.

5. Children of minority groups whose first language is non-official learn writing and language skills in a second, official language as well in bilingual programs as they do in regular official language programs. However, exactly how well they do is indeterminable, since investigators have rarely used controls born and educated in that language. (An example is Turkish children learning Dutch in Holland.)

Reading

Reading in an Official First Language

The Canadian Tests of Basic Skills (CTBS) (reading subtest) and the *Metropolitan Achievement Test* (MAT) (word knowledge, word discrimination and reading comprehension subtests) have frequently been used to evaluate the English reading ability of French immersion students in Quebec, Ontario and British Columbia. (Other standardized reading tests, including readiness tests, have also been used by some.) In most cases, the investigators have compared the scores with scores of similar children in regular English programs. (I.Q. and SES are sometimes controlled.) The findings of these studies are quite consistent. In the case of early immersion studies that begin in kindergarten, the kindergarten children immersed in French are found to be as ready for English grade one as regular English program children. At grades one through three, prior to the introduction of formal English language instruction, the immersed students lag behind the controls in English reading. The immersion students make a quick recovery in English reading, usually beginning in grade three, after English language arts have been introduced. In grades four and five their skills equal those of the English controls, while in grades six and up their skills are sometimes better. In most cases of late immersion programs, there is no initial lag.

Andrew et al., 1980
Barik & Swain, 1975
Barik & Swain, 1978
Barik et al., 1977
Bruck et al., 1973
Bruck et al., 1974
Bruck et al., 1975
Crawford, 1984
Cziko, 1976
Edwards & Casserly, 1976
Genesee, 1978(b)
Genesee et al., 1977
Genesee et al., 1978
Lambert & Tucker, 1972
Lapkin et al., 1981
Oliver et al., 1976
Shapson & Day, 1982
Swain & Lapkin, 1977
Swain et al., 1981

Two American studies of English-speaking children in bilingual programs; one a Spanish immersion program in Culver City, California and the other a program of 50-50 English/Spanish repeated instruction (see page 23) corroborate the findings of the Canadian studies. English reading is not jeopardized, although an initial lag may occur in a program of total immersion. Reading was tested with the *Inter-American Tests* and the *Stanford Achievement Test.*

Cohen, 1974
Gaardner & Richardson, 1968

Six studies have looked at children who live in a dominant English-speaking environment and often use English at home, but who take part in bilingual programs involving a heritage language. The English/Irish programs have been described on page 22 and the English/Ukrainian have been described on page 6. The following excerpts from Veidt (1976) describe an English/German bilingual program in Cincinnati:

Chapman, 1982
Edmonton Public Schools, 1979
Ewanyshyn, 1980
Macnamara, 1966
Muller et al., 1977
Veidt, 1976

> In the spring of 1974, the Cincinnati Board of Education gave its approval for the establishment of a unique public-school German language program: the German-English Bilingual Alternative School. ...

The creation of such a program in Cincinnati is not unusual in view of the public schools' educational heritage and beneficent historical attitude toward German studies. ... strives to provide program participants with the requisite tools for the mastery of the German language in a setting which also stresses academic achievement in the regular elementary school curriculum. Enrollment is open to any pupil residing in the district who is free of uncorrected speech and hearing impairments and obvious learning disabilities. ...

Bilingual German instruction was introduced in the autumn of 1974 to some 200 monolingual first- and second- grade pupils in eight classes at two Cincinnati elementary schools. Each year the program expands vertically to encompass the next grade level. A nine-to-twelve-year sequence is currently envisioned.

The initial three years of the elementary curriculum have been designated as the bilingual readiness portion of the program. During these years approximately one-fourth (70 minutes) of the daily instructional time is devoted to German language learning. The seventy-minute segment is divided into a morning and an afternoon session during which an itinerant German teacher visits each class. The remainder of the instructional time is given over to the regular elementary curriculum.

The second language time-block is not utilized solely for German language study per se. Mathematics, music, art, and to a lesser extent social studies and physical education are also taught through the medium of German. The amount and frequency of such content increase with the competency of the pupils in manipulating in German the processes and concepts involved.

> Reading and writing in German are not introduced until the second year of instruction. This delay is based on the premise that the simultaneous introduction of reading in two languages can lead to possible interference and, thus, can be detrimental to the development of proper reading skills in both languages. Except for occasional discussions on selected cultural topics, the bilingual segment is conducted entirely in German.
> (Veidt, 1976, pp.45-6)

The research data for these programs (using various standardized tests such as MAT, CTBS, MHE, Gates-MacGinitie and the Stanford Achievement Test) show that children learn to read English while in these bilingual programs just as well as if they had been in regular English-only programs.

Cowan & Sarmed, 1976
Tucker et al, 1970

The study of pupils in a 50-50 Pilipino/English alternate day program (see page 11) and a study of pupils in Persian/English partial and full immersion programs generally show that the children learn to read in an official (for most, the first) language while studying English as a second language. (The Iranian study reports some exceptions dependent on SES).

Reading in a Heritage Language

Several studies of Spanish/English bilingual programs in the United States have taken up the question of what happens to a child's heritage language while enrolled in a bilingual program. All have used the Co-operative Inter-American Test Pruebas de Lectura to test Spanish reading, and all (except one) have compared the results with similar children in English-only programs. These bilingual programs vary widely in the amount of time the heritage language is taught as a subject and/or used as a medium of instruction. The Coral Way and Redwood City programs have been described on pages 7 and 23. A Connecticut "pairing" model for Puerto Rican children is described as follows:

> The children in the experimental group were taught their basic skills -- reading, writing, arithmetic, social studies (emphasizing the history and culture of Hispanic peoples), and science -- in Spanish by one teacher. At the same time, an English-speaking Anglo teacher

> began teaching English, using an aural-oral approach. When individual children developed a sufficient English oral vocabulary, she began teaching them to read and write in English. The Anglo teacher was responsible not only for developing the students' skills in the English language, but also, in concert with the Spanish-speaking teacher, for providing art, music, and integrated learning activities for the children.
> (Plante, 1977, p.427)

A New York City project at the junior high school level taught reading skills in Spanish:

> The experimental treatment was instruction in standard Spanish with emphasis on specific reading skills in Spanish. Specially prepared materials and procedures were employed to teach reading skills in Spanish. These skills included word attack, using context to develop word meaning, determining main ideas of paragraphs, following a sequence of events, following written directions, making inferences, recalling stated facts and skimming.
>
> Spanish instruction was given the experimental group four times a week for 45 minutes per session at School A and three times a week for 45 minutes per session at School B. The control group of School A was scheduled for four additional periods of art, music, and health education. The control group of School B was scheduled for three additional periods of art and health education.
> (Kaufman, 1968, pp.522-3)

Three of these studies found that the children in the bilingual Spanish/English programs scored mostly the same in Spanish reading as those in English-only programs. This is a difficult finding to interpret, because no comparisons are made with Spanish born and educated children. Both groups could be doing very poorly or very well. If both are learning to read in Spanish, then the controls must be learning to read in

{Cohen, 1975
{Cohen et al., 1976
Gaardner &
Richardson, 1968
Moore & Parr, 1978

Spanish with no formal instruction -- English reading skills must be transferred to their heritage language, Spanish, or the children must be picking up the skills outside of school. Cohen et al. speculate about the reasons for this finding in California:

> A number of explanations might be given for the fact that one group of Mexican American children from the Comparison school, where no instruction was given in Spanish, scored higher on Spanish reading that the bilingual group. These children may have been transfering strong English reading skills to Spanish reading. It is also possible that these children ... were getting help in Spanish reading at home where Spanish was used. Also there is some indication that many of the children in the Comparison group spent summers in Mexico where they may have learned to read in Spanish. Thus, there are many other variables besides formal instruction which might affect a child's ability to read Spanish.
> (Cohen et al., 1976, p.9)

The dominant influence of the Cuban culture in Florida has been discussed on page 23. Many Texas neighborhoods have predominantly Mexican cultures. Pryor describes the environment of four San Antonio schools as follows: Pryor, 1967

> ... these four elementary schools are located in a section of San Antonio that is 100 per cent Mexican-American where poverty is everywhere evident. Spanish is the language which is spoken predominantly in the area. All of the children in the project spoke Spanish before starting to school. ... Even the radio and television programs are in Spanish.
> (Pryor, 1967, p.6)

It may be, then, that at the elementary grades at least, children will learn to read their heritage language in any type of bilingual program, as long as the surrounding community is dominated by the heritage language and culture.

Puerto Rican children, on the other hand, in Connecticut and New York, may not be in neighborhoods that are so saturated with the Spanish language and Puerto Rican culture, for two studies have shown that the children learn to read Spanish better in a Spanish/English bilingual program than in English- only programs where they would need to learn to read Spanish outside the school.

Kaufman, 1968
Plante, 1977

The Finnish children in Sweden (see page 27) are in an environment that discourages the use of Finnish and the maintenance of the Finnish culture, consequently, they too learn to read Finnish better in a Finnish/Swedish bilingual program than in a Swedish-only program, although neither situation produces the ability to read Finnish as well as Finnish born and educated children in Finland.

Löfgren & Ouvinen-Birgerstam, 1982

Ukrainian/English bilingual programs in Edmonton and Manitoba helped the children learn to read in Ukrainian (teachers rated their skills quite highly) but the lack of any kind of control groups makes it difficult to draw further conclusions. (See page 6.)

Chapman, 1982
Edmonton Public Schools, 1979

And finally, Genesee et al. found that children could learn to read Hebrew as well in a trilingual program (Hebrew, French and English) as in a bilingual program (Hebrew and French). The children were first English-speakers; Hebrew was their language of culture and religion. Again, the lack of a control group born and completely educated in Hebrew makes it difficult to say just how well they read in Hebrew. (More details are given on page 6.)

Genesee et al., 1978

Reading in a Non-official, Non-heritage Second Language

It is not often that elementary children are taught to read in a second language that is non-official and non-heritage. The Coral Way two-way bilingual program in Florida, previously described on page 23, however, is one instance. English-speaking children were involved with learning to read in Spanish. Using the *Co-operative Inter-American Reading Tests,* the children were found to be making good progress toward learning to read in Spanish, although the lack of a Cuban born and Spanish educated control group makes it difficult to say just how good that progress was. The investigators write that after four years, the children still achieved better through English than through Spanish but that the difference was decreasing year by year.

Gaardner & Richardson, 1968

The Culver City Spanish immersion program in California is a second instance. These excerpts describe the setting and program:

Cohen, 1974

> A "Pilot" group of nineteen five-year-old monolingual English speakers were taught the kindergarten curriculum completely in Spanish. ... In the fall of 1972, fifteen English-speaking children from the original Pilot kindergarten continued with Spanish immersion in grade 1, and six dominant or monolingual Spanish-speakers were added to the group. A new "Follow-Up", kindergarten group of English speakers received the same Spanish Immersion program that the Pilot group had received, with the same Mexican-American teacher. ... There was no special funding, no teacher aides, and no special curriculum or hardware. In many instances, the Spanish Immersion teacher simply observed and borrowed techniques from the conventional English kindergarten and first-grade teachers. ...
>
> The children knew that Spanish was the language of instruction right from the start. When native Spanish-speaking students were added to the classroom at the first-grade level, they were welcomed by the English-speaking students as models of Spanish, and, more important, as friends. ...
>
> Parental support for the Spanish-Immersion program has been very strong. ... Two families reported changing their personal plans for the sake of the program. ... One Anglo parent expressed pleasure that the project would enhance cross-cultural understanding.
> (Cohen, 1974, pp.95-7)

Students in the Pilot group were given the Inter-American Prueba de Lectura as a test of Spanish reading at grade one. The test was also administered to students of similar age in Ecuador, to obtain comparative data on Spanish reading within a monolingual Spanish school system in a Spanish-speaking country. There was no significant difference between the two groups on either the subtests or on the total test.

A third experiment investigated the extent to which elementary school children in bilingual programs in Iran learned to read two languages - Persian and a non-official second language, English - that have quite different linguistic and writing systems. The authors describe the sociolinguistic context as follows:

Cowan & Sarmed, 1976

> Although Persian (Farsi) is the main language of communication in Iran, knowledge of a second language is considered a desideratum for advancement in most fields. Indeed, all upper middle class and upper class members of society are presumed to have some command of one foreign language, and both the King and the Queen speak at least two other languages. Parents who send their children to bilingual schools are members of the upper middle class and upper class. Their commitment to bilingual education is evident in their choice of a bilingual school over one of the better quality private monolingual schools. The children attending the bilingual schools have an extremely positive attitude toward the type of education they are receiving. (Cowan & Sarmed, 1976, pp.96-7)

Iranian children in grades one, three and six in full immersion (all instruction in English with 1 1/2 hours of Persian a day) and partial immersion (subjects taught in English and Persian for 1/2 day each) bilingual programs were administered the vocabulary and comprehension subtests of the Gates-MacGinitie Reading Tests and compared with students from an English monolingual school with no Iranian children. At grades one and three, children in the two bilingual programs scored as well or better than the controls. However, at grade six the experimental children (particularly those of monolingual Persian home backgrounds in the partial immersion program) tended not to score as well as the controls (usually the vocabulary subtest).

Reading in an Official Second Language

The studies of Canadian French immersion programs (early and late; full and partial) have shown that English-speaking children learn to read the official second language, French, better than similar children in regular programs that teach French-as-a-second language. However, when their scores were judged according to norms for native French-speaking pupils in

Andrew et al., 1980
Barik & Swain, 1975
Barik & Swain, 1978
Barik et al., 1977
Bruck et al., 1973
Bruck et al., 1974
Bruck et al., 1975

Montreal, the investigators usually concluded that the children did not quite reach native-like proficiency. When scores were compared to specially chosen control groups of Montreal French-speaking and educated children, immersion program children in some studies did as well and in other studies did not. A couple of studies suggest that as early immersion children reach higher grades, at which time the percentage of French in the program is frequently decreased, reading skills may begin to fall even further behind French control children. The studies generally show that the amount of contact time in French is important in learning to read French; that is, full immersion is more effective than partial immersion; early immersion is more effective than late immersion; and, out of class use of French helps.

Crawford, 1984
Cziko, 1976
Edwards & Casserly, 1976
Genesee, 1976
Genesee, 1978(b)
Genesee et al., 1977
Genesee et al., 1978
Lambert & Tucker, 1972
Lapkin et al., 1981
Shapson & Day, 1982
Shapson & Kaufman, 1978
Swain & Lapkin, 1977
Swain et al., 1981
Tucker et al., 1976

Several of these researchers used the norms of the Test de Rendement en Français. Other researchers used tests developed at the Ontario Institute for Studies in Education by the Bilingual Education Project such as the Test de Lecture and the Test de Compréhension de L'Écrit. The Test de Lecture "California" was also used. Others had children read passages from books, magazines, and newspapers or read and fill out job application forms.

Macnamara's study in Ireland (see page 22) reports findings similar to those of the Canadian French immersion studies. Using a test of Irish constructed by inspectors of the Department of Education including items measuring vocabulary and comprehension of prose passages, he found that Irish quotients increased for the English-speaking Irish children as the use of Irish as a teaching medium increased. The group immersed entirely in Irish until the fifth standard was even as good as the native Irish-speaking children in Western Ireland.

Macnamara, 1966

Grade twelve French students in a bilingual French/English program in the Niagara South Board of Education (see page 30) and grade one Filipino students in a bilingual Pilipino/English program in the Republic of the Philippines (see page 11) were both tested in their English reading ability. For both groups of students, English is a second official language of wider communication. The results indicated that both were making progress in English reading but that control students educated entirely in English were somewhat better.

Popp, 1976
Tucker et al., 1970

Another set of thirteen studies focus on children who occupy a minority status in a country and have a first language that is non-official in that country. Bilingual programs have been started for such children, usually on the premise that the children will do better in the official second language if their first language is recognized and used in the educational setting.

Bacon et al., 1962
Gale et al., 1981
Modiano, 1968
Plante, 1977
Rosier & Farella, 1976

Five of these studies report impressive positive findings. First, the bilingual program for Aboriginal children in Australia has been described on page 13. In 1976, the children in Years five, six and seven of the bilingual program were given the Schonell Reading Age Test and the Dolch Sight Words Test and compared with similar children in the regular English monolingual education system. At the Year five level, the English-only children were performing significantly better than the bilingual children. However, by Year six, there was no significant difference between the performance of the bilingual children and the English-only children, and by the Year seven level, the superiority of the bilingual children was statistically highly significant on one test. The authors concluded by writing:

> It is plain that although the bilingually schooled children generally performed better than the children from the English-only program, their standards were still considerably below the national average. Bilingual education is effecting an improvement in standards, but it will need to be supported by further research into crosscultural education and Aboriginal learning and cognition, and by improved professional training of those involved in Aboriginal education.
> (Gale et al., 1981, p.309)

Secondly, the bilingual program for Puerto Rican children in Connecticut has been described on page 35. At the end of the two-year study period, the children in both the experimental and control groups were analyzed with the English version of the Inter-American Reading Tests. The experimental group of second- and third-grade children achieved a greater growth in English reading than did the children remaining in the English-oriented classrooms. This author concludes:

> Judging from what has taken place in the bilingual-bicultural program for children at Columbus School, there seems to be no doubt that students who are dominant in a language other than English benefit greatly from a program that teaches

> all the basic skills in Spanish combined with English language arts instruction.
> (Plante, 1977, p.427)

A basic assumption of a third bilingual program -- for Navajo children at Rock Point, Arizona -- was that learning to read in the language one speaks will probably result in better reading skills, which will later result in better reading in the second language, English. Aministration of the Stanford Achievement Test to fourth and fifth graders in the bilingual program revealed that although the students were below the national norms, they were not as far below as similar children without bilingual education had been in an earlier year. When compared with children from eight other English monolingual BIA schools on the Navajo reservation, the bilingually educated children were much closer to the national norms and demonstrated a greater growth rate in reading skills. The researchers also compared Navajo children in a continuous bilingual program with those in an interrupted one and found that the continuous program was more beneficial. While a certain caution must be exercised because no attempt was made to account for or control the many other variables, the authors give the following interpretations and conclusions:

> Students taught to read in a language that is unfamiliar face two tasks. They must learn to understand (if not talk) the new language. And they must learn the skill of reading, using that language. In the bilingual approach, reading is taught in a familiar language, reducing the task facing the child to that of learning the skill of reading. Once reading skills have been established in the first language, they can be transferred to the second language (which the child has been learning orally for some time).
>
> Both the fourth and fifth graders in this study had received instruction in content areas in Navajo since the third grade. The teaching of Science and of Navajo Social Studies in the Navajo language may have given students practice in critical thinking beyond the level accessible to them in a monolingual English curriculum. Teaching in Navajo may

> also have given the Navajo language equal prestige with English. ...
>
> Data presented here suggests that the effects of (continuous) bilingual instruction may be cumulative: that while Navajo students who have recently (in 2nd grade) added reading in English to reading in Navajo may do no better on standardized achievement tests than Navajo students who began reading in English, they do achieve better test scores each year thereafter. Nor does the difference seem to remain the same. The students who learned to read in Navajo appear to obtain scores progressively higher than those who did not. In effect, their rate of growth helps them to achieve progressively closer to the "national norms" in each grade third through sixth, instead of maintaining a continuous "educationally retarded" level of achievement.
> (Rosier & Farella, 1976, pp.387-8)

A fourth study examined the effectiveness of bilingual instruction with Cherokee Indian students. The Cherokee tribe in northeastern Oklahoma was identified as one of the American Indian tribes with the greatest need for bilingual education because of their high dropout rate from the public schools, their language deprivation, and their high unemployment and poor economic conditions. The Cherokee Bilingual Education Program was funded and began operation in 1969 in four rural dependent schools in Oklahoma. Because the project schools did not have bilingual teachers, bilingual Cherokee Indian teacher aides were employed to work with the classroom teacher in a team effort to provide bilingual education for the Indian child. The SRA Achievement Series was administered to two treatment groups of eighth grade students (one had participated in the bilingual program for five consecutive years, the other for four) and a control group who did not receive bilingual instruction. Control variables were educational ability, age, sex, degree of Indian blood, Indian tribe, pass-fail record, grade point average, speaker of Cherokee and father's educational level. The results related to reading were:

1. When the reading achievement scores of Indian children who received bilingual instruction for five

> consecutive years were compared to the reading achievement scores of comparable Indian children who did not receive bilingual instruction, the Indian children who received bilingual instruction scored significantly higher on the reading achievement subtest than did those not receiving bilingual instruction.
>
> 2. When the reading achievement scores of Indian children who received bilingual instruction for four consecutive years were compared to the reading achievement scores of comparable Indian children who did not receive bilingual instruction, the children who received bilingual instruction scored significantly higher on the reading achievement subtest than did those not receiving bilingual instruction. (Bacon et al., 1982, p.36)

The fifth study is one that is widely quoted and involves Indians in the Highlands of Chiapas, Mexico, descendants of the Maya Empire, who have preserved much of their ancient culture but who are rapidly being introduced to the modern world. The details are interesting:

> Three tribal areas were selected because of differing prevailing attitudes towards schooling. Tzeltal-speaking Oxchuc was chosen because, of all the Highland tribes, it has shown the greatest enthusiasm for schooling; Tzotzil-speaking Zinacantan has shown the greatest resistance while at the same time being the most exposed to outside influences; Tzotzil-speaking Chenalho occupies an intermediary position. ... (Modiano, 1968, p.35)
>
> ... within each tribal area an equal number of Federal or State sponsored schools were matched as closely as possible, on the basis of demographic data for the hamlets they served, with the bilingual schools of the National Indian Institute. In the Federal and State schools reading was taught exclusively in the national

> language; in Institute schools it was introduced through the vernacular. Two principal criteria were used to determine with which approach there was greater reading comprehension in the national language: first, proportions of students who were selected by their teachers as being "... able to understand what they read in Spanish"; second, scores on a group test of reading comprehension in Spanish which was administered to the selected students.
> (Modiano, 1968, p.35)
>
> Because of the high rate of failures (common throughout the nation), poor attendance, competition with child labor, and later entrance for some students, ages varied considerably within each class and ranged from six-year-olds to teenagers in most beginning classes.
> (Modiano, 1968, pp.38-9)

In all three tribal areas, the results of the teachers' ratings and the group reading test showed that the children in the bilingual schools could read the official language, Spanish, better than those in the Spanish monolingual schools. The author discusses the results as follows:

> ... youngsters of linguistic minorities learn to read with greater comprehension in the national language when they first learn to read in their mother tongue than when they receive all reading instruction in the national language. It is less confusing and discouraging to learn one new skill with known material than to learn two new and only somewhat related skills with material that has no meaning. Meaning is essential to reading comprehension. A second consideration is that the negative connotations which, in some cases, accompany the learning of a second language tend not to contaminate learning to read in the mother tongue.

> The Mexican study also showed that teachers' ability to communicate with their students and their attitudes toward them may have outweighed their training or educational level.
> (Modiano, 1968, pp.42-3)

The remaining seven investigations did not report such strong positive evidence. First, the Redwood City bilingual program (see page 7) that introduced Spanish and English reading almost simultaneously found that on the Inter-American Tests of Reading and the Cooperative Primary Tests of Reading, the children in the monolingual programs did better in English reading. The authors speculate that the nature of the program and teaching may be related to the results:

(Cohen, 1975
(Cohen et al., 1976
Gaardner &
Richardson, 1968
Kaufman, 1968
Löfgren & Ouvinen-
Birgerstam, 1982
Moore & Parr, 1978
Pryor, 1976
Wijnstra, 1980

> The theory was that initial reading in the dominant or native language would help the child read better in English. ... These findings suggest that reading taught bilingually may not facilitate reading in English; that instead, children who learn to read first and exclusively in English appear to do better in English reading over time.
>
> The difference in teaching may also have influenced the trend. In the bilingual program reading in English and Spanish were introduced to Spanish speakers almost simultaneously, very possibly to the detriment of average or poor readers. The Comparison school was known to have excellent English reading teachers from the start. ... Although highly motivated and enthusiastic, the bilingual program's teachers were not as experienced in teaching English reading, nor had they generally had as much teaching experience altogether. Thus, the findings need not indicate that bilingual education is incapable of making good English readers out of readers who start in their vernacular or bilingually, but rather that specific bilingual methodologies may not be successful under certain conditions.
> (Cohen et al., 1976, pp.7-8)

Moore and Parr designed a study to measure and compare the effectiveness of four programs: a maintenance bilingual program, a transitional bilingual program, a minimal bilingual program, and a nonbilingual program in one Texas school district. Maintenance classes operated on the assumption that Spanish-dominant children would learn more reading if their native language skills were refined and reinforced. The transitional approach used Spanish as a means of communicating with students when they did not understand instruction in English. This approach focused on improving the students' ability to learn in English. Early in the program the time devoted to instruction in Spanish was comparable for the maintenance and the transitional approaches. Over the year, however, in the transitional classes, instruction in Spanish was gradually lessened in favor of English. Using the Comprehensive Test of Basic Skills, the researchers found that the nonbilingual classes scored significantly higher than the bilingual classes on measures of reading and language achievement in English. However, a limitation of the study is that it did not include random assignment of students to the four programs and there is a suggestion in the paper that the bilingual classes were made up of children of limited English-speaking skills while the nonbilingual classes were made of English-dominant children.

Pryor studied Spanish-speaking children in San Antonio, Texas (see page 37) in four schools each with a bilingual program in grade one where the children studied Spanish for an average of one hour and twenty minutes a day. In one school, the children made good progress in English reading when compared with Spanish-speaking children fully competent in the use of English assigned to regular monolingual English programs. In two schools the progress was not so pronounced, while in the fourth there was no difference.

In the Coral Way two-way bilingual program in Florida (see page 23) there was no difference in the English abilities of bilingually and monolingually educated Cuban children.

Similarly, Wijnstra, in his study of Frisian children (see page 13) found the children had reading comprehension scores in Dutch that did not vary by program -- bilingual Frisian/Dutch and monolingual Dutch. However, a surprising finding is that children in both these programs were doing about the same as the rural Dutch children of Utrecht.

The purpose of a New York City junior high school study for seventh grade Spanish-speaking students (see page 36) was to determine if instruction in the native language would tend to interfere with, to facilitate, or to have no effect on reading ability in English. Using the Durrell-Sullivan Reading Capacity and Achievement Tests, the investigator found some evidence of positive transfer and no reliable evidence of interference and concluded:

> Planned transfer of learning from Spanish to English has some value for improving reading ability in English of Spanish-English bilinguals who are retarded in reading English. Direct instruction in reading Spanish should be offered to Spanish-speaking retarded readers because of its potential value as a source of transfer to reading ability in English, and because reading ability in Spanish has value in its own right.
> (Kaufman, 1968, p.527)

Finally, the experiment with Finnish children in Sweden (see page 25) found that the bilingual program children were behind in Swedish in grade one when compared with monolingual program Finnish children, but that in grades two and three their achievements were at the same level. The authors concluded that Swedish language development did not appear to be negatively influenced by the bilingual instruction. Both groups were one standard deviation below Swedish norms.

Bilingual Children in Monolingual Programs

Rogers & Wright, 1969
Spence et al., 1971
Tsushima & Hogan, 1975

Three studies have focused on the circumstance of children from bilingual home environments in English-only school programs and how they progress in learning to read English. The results are somewhat contradictory. Tsushima and Hogan tested children with Japanese mothers and English-speaking fathers and compared them with children whose parents were both English-speaking and found that at grade three, the bilingual children did as well as the monolingual children but that in grades four and five they were significantly poorer in English reading comprehension. Spence et al. found no significant difference on the Metropolitan Readiness Tests between grade one Mexican-American children from bilingual homes and those from monolingual Spanish homes. Rogers and Wright classified children entering Toronto schools into two groups -- monolinguals who spoke only English on registration in kindergarten and E.S.L. children, some of whom spoke no English but would soon be exposed and some of whom spoke English and another tongue. Using teachers' ratings and the Metropolitan Achievement Tests, the authors reported that in comparison to the monolingual children, the E.S.L.

children started school with a considerable performance deficit but had overcome the deficit by grade three.

Summary

This section may be summarized as follows:

1. Children whose first language is official in the country learn to read that language with no detrimental effects while learning a second language (heritage, official or non-official) in a variety of bilingual programs. In full immersion programs, an initial lag is frequently reported. (Examples are English-speaking children learning their heritage language, German, in Cincinnati; English-speaking children learning the official second language, French, in Toronto; and English-speaking children learning the non-official second language, Spanish, in California.)

2. Children can make progress in learning to read a heritage language in a variety of bilingual programs. The progress is rarely compared to control children born and educated in that language, so the extent of the progress is difficult to judge. There is some suggestion that if the children are in a community where the heritage language is dominant, elementary reading skills can be learned in the heritage language without the advantage of a bilingual program. (An example is Mexican-American children in Redwood City, California learning Spanish.)

3. Children can make progress in learning to read a second language that is non-official and non-heritage in different bilingual programs. Reasons for learning a non-official, non-heritage second language may relate to the world status of the language or to the proximity of a second culture. (An example is Iranian Persian-speaking students learning English.)

4. Children whose first language is official can make progress in learning to read a second official language in a variety of bilingual programs. The more contact time in the second language, the better the development of skills. (An example is English-speaking children learning Irish in Ireland.)

5. Children whose first language is non-official and who occupy a minority status in a country may learn to read an official second language better if first introduced to reading in their own vernacular. (An example is Navajo children learning English in Arizona.)

General Language Proficiency

Measures of language proficiency in two investigations have been reported in the form of overall scores rather than as speaking, listening, writing and/or reading scores.

Hébert et al., 1976

On July 16, 1970, the Legislative Assembly of Manitoba unanimously adopted Bill 113 that officially recognized French and English as languages of instruction in Manitoba public schools. However, many Franco-Manitobans were reticent in availing themselves of their new educational rights because, as Hébert et al. point out, they were quite assimilated. That is, during the 1972-73 school year, close to 40% of 16,263 francophone pupils did not take a single course taught in French and, according to the 1971 census, only 42.7% of 86,515 persons whose ethnic origin was French used French regularly in their daily lives. The francophone parents feared (1) that their children would be less successful academically in programs having a high percentage of courses in French and (2) that their command of English would deteriorate. One goal of the study done by Hébert et al. was to assess the francophone students' competence in English and French in relation to the overall percentage of instruction that they received in the two languages.

The research project involved 2,144 francophone pupils in 115 grades three, six and nine classes in rural and urban centres. Controlling for intelligence, socio-economic level and motivation, the investigators concluded:

> The results of the research project clearly indicate that the percentage of instructin received in French in class has no influence on the pupils' performance in English. In other words, a pupil will do just as well in English regardless of whether he or she received 20% or 80% of his or her instruction in French. Academic achievement in English is completely independent of the amount of French instruction received; this finding holds good for all three grade levels tested.
>
> The situation with regard to Français, however, is completely different. Here there is a clear

> relationship between the amount of instruction received in class in French and the students' performance in that subject. The relation between the percentage of French in class and achievement in French as a subject is both positive and strong; in other words, the more French is used as a language of instruction in the classroom, the better the pupils perform in Français as an academic subject.
> (Hébert et al., 1976, pp.12-3)

> It seems therefore that in Manitoba, a society which is overwhelmingly anglophone and where French is the language which is difficult to preserve, school programmes having a high percentage of instruction in French offer the best possibility of ensuring effective bilingualism among children, combined with high achievement in other academic subjects.
> (Hébert et al., 1976, p.22)

Saegert et al, 1974

The second investigation presents a conclusion similar to that for French achievement above but with an interesting and thought-provoking twist. The subjects were Arabic-mother-tongue students enrolled in the American universities in Cairo and Beirut. The students were asked to indicate those grades (from one to twelve) in which they had: (1) studied English as a foreign language, (2) studied French as a foreign language, (3) used English as a medium of instruction, and (4) used French as a medium of instruction. Their English proficiency was then assessed with the Michigan Test of English Language Proficiency or the English Entrance Examination. The authors concluded:

> A better overall predictor of English proficiency was whether or not the Ss had experience with a foreign language as a medium of instruction. Furthermore, the medium of instruction did not necessarily have to be English, as can be seen by the relatively high performance of Ss with FMed. One conclusion which can be made is that exposure to a foreign language used as a medium of instruction may result in improved FL proficiency, even when the medium is not the

> same as the target language (in this case, English).
>
> Apparently, in the two present investigations, students who attended classes in which some Indo-European language was used as the medium of instruction achieved greater EFL proficiency than students who did not, regardless of the number of years they had studied English as a formal classroom subject. ... the main purpose of this note remains to question the ready acceptance of the maxim that "lots of English is good for lots of people" which seems so prevalent in many countries and to suggest that educational researchers working in such countries may wish to begin a more systematic search for factors related to increases in English-language proficiency at various stages of study under diverse circumstances.
> (Saegert et al., 1974, pp.103-4)

Summary

These two studies of very different subjects suggest that proficiency in a language that is not the dominant language of the community may be increased in proportion to the amount of time it is used as a medium of instruction in school and that using the language as a medium is more productive than teaching it as a subject.

Language Usage

Four investigators have considered the degree to which children in bilingual school programs use one or both languages in the out-of-class environment. Two have studied the use of French by children in Canadian French immersion programs. Shapson and Day asked early French immersion students in grades five and six about their usage of French in British Columbia (no control group was involved) and were told by the majority of the students that they talked "a little" French outside of class and that they did not talk with their friends in French at all at recess and lunch time. Responses from early and late French immersion students in the second study in Montreal were similar:

(Cohen, 1975
(Cohen et al., 1976
Edmonton Public Schools, 1979
Genesee, 1978(a)
Shapson & Day, 1982

> Thus, it would appear from the students' own reports that the Immersion experience has not resulted in any actual greater self-initiated use of French outside the school setting with one exception -- the grade 6 Immersion students reported that they read French books and magazines more often than did the Control students. There is also an apparent lack of differential interest or effort in creating situations where French could be used. ... Immersion students were not more likely than the regular students to initiate a verbal exchange in French with someone who they thought was French-speaking. (Genesee, 1978(a), p.26)

The researchers of the English/Ukrainian program in Edmonton (see page 6) asked the teachers and parents to judge the degree to which the experimental students used Ukrainian out of class. Over three-quarters of both groups reported that the children "rarely" or "sometimes" spoke Ukrainian with other people outside of class.

Finally, the researchers of the Redwood City Spanish/English project in California (see page 7) used observers, students' self-ratings and parents' ratings to determine the usage of both English and Spanish by the experimental and the control groups. They found that the bilingual group used more Spanish than the control group and more Spanish than English. The environment of both groups of children was very much a Spanish one:

> The parents used Spanish almost exclusively at home, and 60% of the husbands were reported to use either Spanish and English or Spanish exclusively with fellow workers at their place of employment. Of those families that went to church (70%), two-thirds said that the priest used only Spanish...
> (Cohen, 1975, p.74)

Summary

These few studies sugggest that a bilingual program in itself does not increase the usage of a language in a community. However, if a community makes extensive use of that language, then the bilingual program might help maintain it.

Mathematics

Mathematics Taught Through the Medium of an Official Second Language

Several investigators of Canadian French immersion programs have addressed the question of how well children learn mathematics when taught through the medium of the official, second language, French. The programs include early, late and partial French immersion and vary substantially in the number of years the children study mathematics through the medium of French and in the ages at which such instruction is begun and discontinued. (In a few cases, the authors do not explicitly state the conditions of the program.)

The majority of the investigators tested the children's progress in mathematics in the English language and compared their scores to English-speaking control children; however, some tested in the French language and used French and/or English controls while a few tested in both languages and used both sets of controls.

Those who tested in English most frequently used the Canadian Tests of Basic Skills and the Metropolitan Achievement Tests (subtests on concepts, problem solving and computation). In the most general terms, with the exception of one study (Barik et al., 1977), the investigators found that the children did as well as English-speaking controls and at times did better. Lambert and Tucker wrote the following about their findings:

> These results indicate very clearly that the French training they received in math had "gotten through" to them. There are two likely explanations: either they are amazingly clever in transferring the fruits of this training, and/or they are obliged by their training in French to relate new notions and concepts to their English reserve of basic meanings at the same time as they develop new complex ideas in French. The fact that they are even more skilled in the application of these ideas than the Controls (at this grade level) suggests that the processes of transferring and relating may make the newly developing concepts

Andrew et al., 1980
Barik & Swain, 1978
Barik et al., 1977
Bruck, 1978
Bruck et al., 1973
Bruck et al., 1974
Crawford, 1984
Edwards & Casserly, 1976
Genesee, 1976
Genesee, 1978(b)
Genesee et al., 1977
Genesee et al., 1978
Lambert & Tucker, 1972
Lapkin et al., 1981
Oliver et al., 1976
Shapson & Day, 1982
Swain & Lapkin, 1977
Swain et al., 1981

> particularly vivid and meaningful, thereby speeding up the learning process itself.
> (Lambert & Tucker, 1972, p.86)

Those who tested in French most frequently used the *Test de Rendement en Mathématiques* developed by la Commission des Écoles Catholiques de Montréal. In most cases, the French immersion children did as well as the French-speaking control children and better than children in regular programs studying French-as-a-second language.

Hébert et al., 1976

The study of Franco-Manitoban pupils in the public school system discussed on page 51 found that (1) achievement in mathematics was independent of the percentage of instruction received in French in the overall curriculum and (2) the language of instruction for mathematics had no effect on achievement in mathematics. The pupils were allowed to choose French or English for the mathematics test and the investigators reported that English was more frequently chosen, even among the 25 - 30% of those who had studied mathematics through the medium of French.

Macnamara, 1966

Macnamara also considered this topic but the research design he used did not lead to clear conclusions. The children's problem and mechanical arithmetic abilities were studied for (1) those taught entirely in English and tested in English, (2) those taught arithmetic in Irish and tested in English, and (3) those taught entirely in Irish and tested in Irish. He found that those taught entirely in Irish and tested in Irish scored lowest in problem arithmetic. One cannot be sure whether the conditions of teaching or testing or both were the cause.

Mathematics Taught Through the Medium of a Non-official, Non- heritage Second Language

Cohen, 1974

The Culver City Spanish immersion program in California modelled after the St. Lambert French immersion project (see page 38) tested Anglo children in grade one with the *Cooperative Primary Test of Mathematics* after two years in the Spanish immersion program and found they performed as well in mathematics when tested in the English language as did comparable students in an adjoining classroom in a regular English school program.

Mathematics Taught Through the Medium of a Heritage Language

Bacon et al., 1982
Gale et al., 1981
Plante, 1977
Veidt, 1976

A few bilingual programs have been designed so that children receive instruction in mathematics through the medium of their heritage language. Researchers have studied such programs for Cherokee children in Oklahoma (page 44), Aboriginal children in Australia (page 13), Puerto Rican children in Connecticut (page 35), and children in a German/English bilingual program in Cincinnati (page 33).

The Cherokee tribe is unique in the area of bilingual instruction among the American Indian tribes because they have their own written language and in 1971 the program studied by Bacon et al. introduced curriculum materials utilizing the Cherokee language through the Cherokee syllabary in grades two through five. In the first few grades of the Milingimbi bilingual education program all math was taught by Aboriginal teachers using their own language. The experimental Puerto Rican children were taught arithmetic in Spanish for two years by a Spanish-speaking teacher. And, mathematics was taught in German, the amount and frequency increasing with the competency of the pupils in the language, in the Cincinnati innovation.

In each case, researchers tested the children in mathematics in the official language, English, and compared the scores to similar children in regular English programs receiving mathematics instruction, of course, in English. The children in the Spanish and German programs were tested in the early elementary grades with the Metropolitan Achievement Tests. The Aboriginal children were tested in years five, six and seven with self-made addition, subtraction, multiplication and division items. The Cherokee children were tested in grade eight with the SRA Achievement Series, having received bilingual instruction for four or five consecutive years beginning in grades one and two.

In all four studies, the bilingual program children scored as well as and mostly better than the monolingually educated children. These results were also true for the more abstract areas of arithmetic and for problem solving. The investigators of the Australian study commented as follows:

> It is interesting to notice from these math test results that the recipients of the vernacular education were at the greatest advantage in the most abstract or cognitively demanding processes: multiplication and division. In processes more dependent upon rote learning, viz. addition and subtraction, the advantage of the bilingually educated children was not so great.
> (Gale et al., 1981, p.308)

Mathematics Taught Through the Medium of an Official First Language in a Bilingual Program

Ewanyshyn, 1980
Muller et al., 1977

The 50-50 English/Ukrainian bilingual programs in the public and separate school systems in Edmonton (see page 6) did not teach mathematics through the medium of Ukrainian, but the researchers nevertheless tested the children's progress in that subject. When compared with the progress of similar children in the regular school program, there were generally no differences. Therefore, the bilingual program appeared to be of no hindrance to a subject taught in English.

Mathematics Taught Through the Media of Two Languages

Cohen, 1974
Gaardner & Richardson, 1968
Trevino, 1970

Some bilingual programs do not teach mathematics exclusively in one language but present the material to the children in some combination of two languages. Three American Spanish/English programs fall into this category. The Redwood City program has been described on page 7 and the Coral Way program of 50-50 repeated instruction has been described on page 23. The third program was developed in Webb County, Texas that borders on Mexico and was set up as follows:

> Both languages, English and Spanish, were used for communication and instruction. Equal time was allotted to alternate instruction in each language of the same material in the first two grades. In the third grade the children were taught half a day in English and half a day in Spanish.
>
> The group was about evenly divided between the English monolinguals and the Spanish monolinguals. ... it consisted of providing the opportunity for the children to help each other learn a second language. When instruction was in English, everyone spoke English. The questions were addressed first to an English-speaking child and next to a Spanish-speaking child who would pattern his answer in English to the previous child's answer. Later when instruction was in Spanish, the questions in Spanish would be addressed to a Spanish-speaking child first, and to an English-speaking child next. It may be conjectured that each child was taught in his own language and

> by being taught bilingually he was able to acquire a second language in natural and meaningful situations provided by normal learning experiences.
> (Trevino, 1970, p.255)

Using English standardized tests of mathematics, researchers found that children in the Redwood City and Coral Way bilingual programs on the whole did the same as similar children in regular monolingual programs. For the Texas program, comparisons were made between the English monolinguals and the Spanish monolinguals in the same program and it appears that the gap between the two groups narrowed over the three years with the Spanish children gaining on the English children.

In the study of Finnish children in a Swedish/Finnish bilingual program (see page 25), the authors describe the mathematics program as composite instruction:

Löfgren & Ouvinen-Birgerstam, 1982

> ... the children being mainly taught in Swedish together with the rest of the class, but with some terms being explained in Finnish by the Finnish teacher. A similar form of instruction with two teachers in the same class is sometimes practised in Swedish schools and referred to as a dual or escort teacher system.
> (Löfgren & Ouvinen-Birgerstam, 1982, p.325)

The mathematics achievement of the Finnish children in the various grades of junior level was slightly below the average for the Swedish norm group irrespective of whether their mathematical skills were tested in Finnish or Swedish. However, when compared to Swedish children in the same classes on mathematics tests and school reports at grade three, they are comparable.

The bilingual experiment in the Philippines discussed on page 11 found that children receiving instruction in mathematics in English one day and Pilipino the next with no repetition in content did the same as those instructed entirely in Pilipino and not as well as those instructed entirely in English irrespective of whether the tests were administered in English, Pilipino or English and Pilipino. (The authors report that those instructed in English, however, were superior at the beginning and that no statistical adjustments were made to account for this in the analysis.)

Tucker et al., 1970

Bilingual Children in Monolingual Programs

Macnamara, 1966
Rogers & Wright, 1969
Skutnabb-Kangas, 1979
Tsushima & Hogan, 1975

Four studies report the outcomes of testing the mathematical abilities of bilingually-oriented children enrolled in monolingual programs. In all four, bilingual children are, at some time, reported to be at a disadvantage when compared to monolingual children in the same programs. The Rogers and Wright study claims that the disadvantage disappears by grade three while the Tsushima and Hogan study claims the disadvantage begins at grade five.

Summary

The results of studies reviewed in this section on mathematics (studies that indicate the language of instruction and testing) suggest:

(1) Children taught mathematics through the medium of an official or non-official second language perform as well when tested in their first official language as similar children taught in the first language. (An example is English-speaking children taught mathematics in French in Montreal.) They also tend to do as well when tested in the second language.

(2) Minority group children taught mathematics through the medium of their heritage language often do better when tested in the official language than similar children taught in the official language. (An example is Aboriginal children taught mathematics in Gupapuyngu and tested in English.)

(3) Children taught mathematics through two languages tend to do much the same as similar children instructed monolingually in the official language. (An example is Mexican-American children taught mathematics in both Spanish and English.)

(4) A bilingual program may not be detrimental to progress in mathematics when the subject is taught and tested in an official first language. (An example is the Ukrainian/English program in Edmonton.)

Science

Science Taught Through the Medium of an Official Second Language

Science has been taught through the medium of French in a few early and late Canadian French immersion programs and tested in grades five and above through the medium of English. No differences were found between the immersion children studying science in French and regular program children studying science in English. The Metropolitan Achievement Tests (Science) were most frequently administered. The late immersion students experienced a lag in the first year.

Barik & Swain, 1978
Lapkin et al., 1981
Swain & Lapkin, 1977
Swain et al., 1981

Science Taught Through the Medium of a Heritage Language

English is the only official language of Nigeria, and within this context Ojerinde designed a study to determine the success of children taught science through the medium of their heritage language, Yoruba, and examined in Yoruba. Using self-made grade four science tests, he concluded that:

Ojerinde, 1982

> ... the child who was taught in the mother tongue and examined in the same language performed better than the child who was taught in the mother tongue and examined in a second language. ...
>
> Similarly, it is evident from this study that when a child is taught in a foreign language, he/she may perform better if examined in the mother tongue. ...
>
> the Yoruba language is adequate as a medium of instruction in science, at least up to the fourth year. Preparation of the material is a surmountable problem. The six-year primary project has done this successfully with regard to primary four science. It is felt that this could be done successfully for the remaining classes. Though it is true that it is difficult to preserve word equivalents precisely, it can be done.
> (Ojerinde, 1982, pp.342-4)

Science Taught Through the Medium of an Official First Language in a Bilingual Program

Andrew et al., 1980

Investigators of an early French immersion program for Anglo children in Toronto chose to test the abilities of the students in science (using the Metropolitan Achievement Tests) at grades five, six and seven. At these grade levels, the amount of English instruction had been increased to 105 minutes a day at grade five and 160 minutes a day at grades six and seven and included the teaching of science in English. The findings showed that after several years of French immersion, the children were as able to achieve in science through the medium of English as similar students in regular English programs.

Science Taught Through the Media of Two Languages

Tucker et al., 1970

As with mathematics (see page 60), the Filipino children were taught science in two languages on alternate days with no repetition of content. All children (including those in control monolingual English and monolingual Pilipino science classes) were administered both English and Pilipino versions of a grade one science achievement test developed by staff. The children taught science through the media of two languages and tested in Pilipino did the same as those taught through the medium of one language. When tested in English, the English monolingual class did best; but they were initially ahead.

Summary

Four of these seven pieces of research suggest that with respect to science, children who are taught science through the medium of an official second language do as well as regular program children when tested in the first official language. (An example is French immersion children in Canada.)

The remaining three diverse studies provide data that are too fragmentary for making further generalizations.

Work Study Skills

Students Immersed in an Official Second Language

Ontario investigators of French immersion programs have sometimes considered the dependent variable, work study skills. Using either the Comprehensive Tests of Basic Skills or the Canadian Tests of Basic Skills, they have tested such skills as map reading, use of reference materials, use of symbols and legends, ability to perceive relationships and ability to extend interpretations beyond given data at grades three through nine. Compared with similar students, the immersion students perform the same and frequently better.

Andrew et al., 1980
Barik & Swain, 1978
Swain & Lapkin, 1977
Swain et al., 1981

Bilingual Children in a Monolingual Program

Tsushima and Hogan found that bilingual children of families with Japanese mothers and American fathers at first did the same or better than monolingual English control children with respect to work study skills but that by grades four and five were performing more poorly on all subtests. The bilingual children were in an English monolingual school program in Japan.

Tsushima & Hogan, 1975

Summary

Bilingual programs may be conducive to developing work study skills.

Cognitive and Linguistic Strategy and Development

Divergent Thinking

Carringer, 1974
Landry, 1974
Torrance et al, 1970

The Torrance Tests of Creative Thinking consist of a verbal test with scores on fluency, flexibility and originality and a figural test with scores on fluency, flexibility, originality and elaboration. Three investigations, one conducted in New Hampshire, one in Mexico and one in Singapore have used this instrument to study the creative functioning (or divergent thinking abilities) of monolingual and bilingual individuals. The three investigations are quite different in design and results. The Mexican study involved high school students; one group was Spanish monolinguals and the other group was Spanish/English balanced bilinguals. Collapsed across sex, the bilingual group scored higher than the monolingual group on verbal and figural fluency, flexibility and originality (elaboration was not tested). While the author admits that intelligence, socio-economic class and other relevant factors were not well controlled in his study, he makes the following points in the discussion of the findings:

> The bilingual individual has an opportunity to develop a "resistance-to-negative-transfer" set, or a flexibility set, on tasks which require flexibility and originality. In learning a second language, the child must detect or intuit these patterns and structures as rules to govern independently the production of new utterances in each language. These processes require adaptability in order that the individual may switch from one rule to another until he reaches the correct response for a particular situation and also to let him examine different categories or hypotheses as he goes from one item to the next. Although only exploratory, this study suggests that bilingualism does promote creative thinking abilities and at least in part serves to free the mind from the tyranny of words. Since the bilingual has two terms for one referent, his attention is focused on ideas and not words, on content rather than form, on meaning rather than symbol, and this is very

> important in the intellectual process as it permits greater cognitive flexibility.
> (Carringer, 1974, pp.502-3)

The New Hampshire study involved students in grades one, four and six; one group was bilingual and randomly drawn from two FLES (Foreign Language in the Elementary School) schools while the other group was monolingual and randomly drawn from two non-FLES schools. The schools were matched as closely as possible in school population, area of the city and socio-economic status. The investigator did not control for intelligence. For the six scores on verbal and figural fluency, flexibility and originality, no significant differences were found at grades one and four. However, a significant difference between language groups was found at grade six, and inspection of the dependent variables, collapsing across sex, showed that for all six dependent variables the FLES group scored higher than the non-FLES group.

The Singapore study involved students in grades three, four and five; one group came from monolingual schools and included Chinese in Chinese-speaking schools and Malays in Malayan-speaking schools while the other group came from bilingual schools and included Chinese in English-speaking schools and Malays in English-speaking schools. Variables such as intelligence, socio-economic status and degree of bilingualism were neither measured nor controlled. For the four scores on figural fluency, flexibility, originality and elaboration collapsed across grades, the monolinguals scored significantly better in fluency and flexibility while the bilinguals scored significantly better in elaboration. The authors' comments are quite different from those quoted above:

> ... it seems likely that the competition of associations arising in the transition from a Chinese or Malay-speaking school to an English-speaking one impairs fluency and flexibility of thinking, especially on timed tests such as those used in this study. It must also be remembered that most of the bilingual children are continuing to live in homes where the first language is Chinese or Malay, as the case might be. Thus, they do not escape even for a day the competing associations arising from the use of two different languages. ...

> the data support the contention that bilingualism does not adversely affect the production of original ideas, as it appears to do in the case of fluency and flexibility.
> (Torrance et al., 1970, p.75)

Bruck et al., 1974
Cummins, 1977
Cummins & Gulutsan, 1974
Jacobs & Pierce, 1966
Lambert & Tucker, 1972

Similar measures of divergent thinking that employ such activities as providing meanings of words, listing uses of objects, listing similarities between objects, suggesting consequences of unusual events and describing patterns and lines have been used by other investigators and scored on such variables as fluency, flexibility and inventiveness to study differences between elementary bilingual and monolingual children. The results are consistent in showing that bilingualism is not a detriment to divergent thinking and that for a few isolated scores is a benefit. There is also a suggestion that balanced bilinguals score higher than unbalanced bilinguals. Jacobs and Pierce found that bilinguals with Czechoslovakian, Polish, German and Greek backgrounds in Florida could list more uses for common objects than monolingual children with similar I.Q.'s. Cummins and Gulutsan reported that balanced French/English bilinguals in Edmonton were more original in listing uses of common objects than unilingual children controlled for sex, socio-economic status and age. At grade three only, Lambert and Tucker found that children in the French immersion program could name more unusual uses for objects than similar children in regular English school programs. Bruck et al. found no differences in these kinds of measures for children in the same project at grade six.

Quinn & Kessler, 1980

Finally, Quinn and Kessler found that bilingual sixth grade children were able to produce scientific hypotheses of a significantly higher quality than monolingual students. The proficient bilinguals were from a Mexican-American low socio-economic area in San Antonio, Texas while the monolinguals were English-speaking children from a high socio-economic level in an upper middle class area of suburban Philadelphia. Each group participated in sessions consisting of science films and discussions that presented the children with science problems that set up discrepancies for resolution. The sessions ended with the students writing as many hypotheses as possible in a rigorously controlled 12-minute period. All of the hypotheses generated by each student were scored for quality. In this test no control for intelligence between bilinguals and monolinguals is mentioned but all sessions for each group were taught by the same teacher in English. The authors attempt to explain their findings in Piagetian terms:

> In Piagetian terms, the disequilibration arising from two linguistic inputs may stimulate the developing bilinguals to work actively to reestablish equilibrium through the processes of assimilation and accommodation. In the hypothesizing processes of language development, the increase in ability to observe details required by the dual language input and consequent increase in uncertainty in responding enhances the conflict between possible hypotheses regarding the linguistic rules. That state of conflict is relieved by generating additional and more acceptable hypotheses until, as an end result, the two linguistic perspectives of the bilingual are encoded. This experience, albeit subconscious, in language hypothesis generation may have a similar effect upon the capacity to generate scientific hypotheses. ...
>
> This study suggests, among other things, that students educated in more than one language will be better problem-solvers than their monolingual peers. And for science educators at all levels this could mean the active recruitment of bilingual students for all areas of science.
> (Quinn & Kessler, 1980, pp.15-6)

Analytic Thinking and Problem Solving

A few investigators have made use of novel tasks to tap the analytic thinking and problem solving abilities of bilingual and monolingual children. One designed an automated, portable problem-presenting apparatus in the shape of a box. On the face of the apparatus was a screen divided into quadrants; beside each quadrant was a control button to be operated by the subject; above the screen was a signal or reward light. A square and a triangle were flashed on the screen in separate quadrants. The subject pressed a button. If it was the correct one, the reward light flashed. Each time a button was pressed, the figures changed position. Number of trials to get a correct solution and percentage of correct solutions were tabulated. Another investigator used cylinders that varied in degrees of height and diameter so that they formed 2 x 2 or 3 x 3 matrices. The children were

Bain, 1974
Bain & Yu, 1980
Ben-Zeev, 1977(a)
Ben-Zeev, 1977(b)
Stafford, 1968

asked to describe, transpose and complete the matrices and then scored on each activity. Still another used two sets of test materials; one set designed for children ages 22 to 24 months, the second, for children ages 46 to 48 months. The first set consisted of a marble, an opaque plastic tumbler and an opaque plastic cup. The basic paradigm consisted of hiding the marble under the cup or the tumbler. The subject was simply and accurately instructed (in four instructional situations) as to its location. A correct response was one in which the child moved directly toward the designated cup or tumbler. The second set consisted of a soft rubber ball and a painted clown's face. The clown's eyes could be lit up, one red and one green. The basic paradigm consisted of the child watching the lights alternate between red and green, off and on, and squeezing or not squeezing the ball in a series of progressively more difficult instructions. A correct response was one in which the child either fully squeezed or, contrarily, made no move to squeeze, in agreement with the instructions (adult, overt-self or covert-self). The investigator who used the matrix of cylinders also had the children classify and reclassify stimuli according to varying rules. Bain used the term "contemplative cognition" to describe tasks that involve classification and generalization in which a subject must discover a rule that will allow certain conclusions to be drawn or certain deductions to be made. He had children discover rules for finding the sum of series of numbers. And finally, Ben-Zeev also used stories and cartoons to determine the ability of children to understand the points of view of various characters in the stories and the ability to see the difference between two parts of a story and to relate them adequately.

These five research studies involving the above strategies involved French/English, Spanish/English, German/French, Chinese/English, Hebrew/English and Navajo/English bilingual children ranging from two years of age through the ninth grade and monolingual children usually of similar intelligence and from similar socio-economic backgrounds. The bilingual samples were selected and defined according to a number of different strategies (see page 3).

The best conclusion one can draw from the many tests of significance in these studies is that bilingualism does not harm the analytic and problem solving abilities of children. In the few instances where significant differences were reported (.05 level), the bilinguals performed better more often than the monolinguals. The bilinguals performed well on classification of stimuli, integration of stories and the task involving the rubber ball and clown's face.

Conceptualization of Objects, Numbers and Measurement

> Concept formation represents a major part of intellectual development. According to Piaget's theory, intellectual development proceeds through qualitatively distinct stages that occur in a definite sequence. During each stage the child acquires the abilities that prepare him for the next stage. The rate of preparation, according to Piaget, is determined by four factors: maturation, experience, social interaction, and equilibration. Experience and social interaction are cultural rather than genetic factors. ...
>
> Experience and social interaction are the two main factors responsible for individual differences or retardation and acceleration of concept formation. ...
>
> Many children are brought up in a bilingual home environment. They learn two languages simultaneously at a very early age. Thus, they are exposed to an environment that is in a way unique and complex. Most of them have two 'worlds' of experience. The factor of social interaction in Piaget's developmental theory includes the explicit and implicit teaching of the child by other people in his environment. Learning two languages or two symbols for every object implies a great degree of explicit teaching. One might hypothesize that a young child learning two languages at the same time is exposed to a greater amount of social interaction when compared to someone his own age learning just one language. The question arises whether the bilingual child's experiences are different enough to effect his intellectual development in any significant way. (Liedtke & Nelson, 1968, p.226)

Cathcart, 1982
Feldman & Shen, 1971
Liedtke & Nelson, 1968

Three studies suggest that the experiences related to children becoming bilingual do affect intellectual development. Liedtke and Nelson tested six aspects of linear measurement based on Piaget's test items: (1) reconstructing relations of distance, (2) conservation of length, (3) conservation of length with change of position, (4) conservation of length with distortion of shape, (5) measurement of length, and (6) subdividing a straight line. The subjects were children who used French and English at home and had a bilingual school program. They did better on all six tests while in grade one than monolingual children with similar intelligence, socio-economic background and kindergarten experience but with a monolingual school experience.

> The results seem to indicate that bilingual children conserve length before monolinguals do. If this is true for other conservations, it could be that bilingualism accelerates development, and the bilinguals reach the concrete operational stage before the monolinguals do. This of course would have important implications for those who teach such students in the primary grades.
> (Liedtke & Nelson, 1968, p.232)

Feldman and Shen experimented with the notion of "object constancy". Each of several objects (cap, plate, sponge, etc.) were physically transformed in view of fifteen bilingual Head Start children of Mexican origin and then placed with second objects identical to the pretransformed objects. Each child was asked, "Which was the one that I showed you before?" When compared with the responses of fifteen monolingual Head Start children of the same age and socio-economic background (intelligence was not considered), the bilinguals did significantly better. The bilinguals were selected by asking classroom teachers and a special language teacher to identify bilinguals. To be classified as bilingual, children had to demonstrate understanding of several simple Spanish questions and to speak Spanish at home.

Cathcart's evidence in support of the bilinguals was also positive but not so strong. He designed a 16-item test that measured the ability to conserve number and measurement; all were conventional Piagetian-type tasks. Children in a French/English primary grade program were compared with children in a regular English program (readiness scores were used as a covariate). The bilingual program children scored significantly better in one-fifth of the tests. None of the children was completely bilingual.

Naming and Renaming Objects

Ben-Zeev, 1977(a)
Ben-Zeev, 1977(b)
Cummins, 1978(a)
Cummins & Mulcahy, 1978
Feldman & Shen, 1971
Ianco-Worrall, 1972
Oren, 1981

Various exercises related to naming objects and using those names have been created by some researchers to study cognitive advantages or disadvantages related to bilingualism. While the exercises vary somewhat in title and details from study to study, they are generally of the following types:

(1) Classifying items representing objects followed by definition of the objects. For example, classify six toys representing six common objects (dog, cow, chair, jam, book, water).

(2) Understanding common names.

(3) Processing language using common names.

(4) Interchanging common names. "Could you call a dog a cow, and a cow a dog?"

(5) Processing language with names interchanged. (Symbol substitution.) "Does this dog give milk?"

(6) Using nonsense names. A car is called a "wug" and the child must answer questions about a "wug".

(7) Incorporating nonsense names into sentences and describing relationships between several objects using nonsense names.

(8) Inventing new nonsense names.

(9) Processing language with words substituted that violate obligatory selectional rules of the language. Say "I" by saying "macaroni". "Macaroni am warm."

(10) Processing language with major parts of speech substituted for minor parts. Substitute "clean" for "into". "The dog is going clean the house."

(11) Believing in the stability of words in the face of destruction of the world's empirical referent. "Does the word giraffe have any meaning if all the giraffes in the world were dead?"

(12) Understanding that words have a nonphysical nature. "Does the word bird have feathers?"

These studies included Afrikaans/English, Spanish/English, Ukrainian/English, Hebrew/English and Irish/English bilingual children ranging from age four through grade six and monolingual children usually of similar age, sex, intelligence and socio-economic background. Bilinguals are selected in a number of different ways.

The majority of any significant differences that did appear in these studies favored the bilinguals. The bilinguals were better most often in interchanging common names. According to Oren, bilinguals who had been exposed to two languages at a very early age and learned two distinct coding systems were better than those who had learned their second language through a process of translation from the dominant language.

Sensitivity to Feedback Cues

Four dissimilar tactics for providing social and cognitive feedback cues used with Ukrainian/English, French/English, Spanish/English and Hebrew/English bilingual children ranging in age from five years through twelve year, and monolingual English-speaking children of similar age, intelligence and socio-economic status suggest that bilingual children and/or children in bilingual programs may be more highly sensitive to feedback cues than their monolingual counterparts.

Bain, 1974
Ben-Zeev, 1977(a)
Ben-Zeev, 1977(b)
Cummins & Mulcahy, 1978
Genesee et al, 1975

Bain used a strategy that he claimed measured "participative cognition". The children were presented with black and white reproductions of portraits painted by the masters. Each portrait expressed one dominant emotion. The children were asked to tell how they would feel if they felt the way the face felt. The bilinguals were significantly more sensitive to the emotional expressions as displayed in the portraits than were the unilinguals.

Ben-Zeev's two studies used feedback cues in the form of nonsense words. The stimuli were "flime" and "tress" on a tape and were presented to the children for two minutes at the rate of two per second. The children were asked to report what they heard. Bilingual children reported more changes in the stimuli, more varied changes, and reported the first change earlier than monolinguals. The author explains the advantage of the bilinguals as follows:

> Bilingual children are expected to report more verbal transformations. They have had to learn to interpret speech of two different structural types, and their initial interpretations have been incorrect more than is usually the case in

> monolingual language learning. This is likely to have resulted in a strategy of quick reinterpretation of the auditory pattern which continues until a satisfactory interpretation has been found. No correct interpretation is possible on the present task, since the stimuli are meaningless, so the reorganizations continue. The behavior is a precocious development in that it is similar to adult responding.
> (Ben-Zeev, 1977(a), p.1012)

In a study conducted by Cummins and Mulcahy in Edmonton, Canada, children were shown four line drawings, two of which depicted different meanings of a sentence which was read aloud by the experimenter. The children were asked to choose the two correct meanings and to give justifications. When they chose only one of the two correct pictures a prompting procedure was instituted in which their attention was drawn to salient features of the other correct picture.

> Examination of the protocols showed that although the bilingual groups at both grade levels were given fewer prompts than either of the other two groups, they made better use of those they were given. ... these data are consistent with Ben-Zeev's hypothesis that bilingual children develop a sensitivity to feedback cues.
> (Cummins & Mulcahy, 1978, p.1241)

And, finally, a study of children in partial and total French immersion programs hypothesized that:

> ... children participating in second-language instructional programs may develop greater differential sensitivity to the needs of others, especially those with a communication handicap, than do children in native-language school programs.
> (Genesee et al., 1975, p.1011)

The children were asked to explain a game to two listeners, one blindfolded and one not blindfolded. The results provided some support for the hypothesis, for the two immersion groups mentioned more about the materials of the game to the blindfolded listener than to the sighted listener. Results for the other variables were either not significant or mixed.

Intellectual Functioning on Standardized Tests

Some researchers have attempted to determine whether monolingual and bilingual young people differ in intelligence as measured by standardized tests. The findings are difficult to interpret, categorize and summarize for a number of reasons. First, researchers use many different tests of intelligence -- verbal and nonverbal. For the twelve studies reviewed here, the following tests were administered as dependent measures:

California Short-Form Test of Mental Maturity
Canadian Cognitive Abilities Test
Kuhlmann-Finch Intelligence Test
Lavoie-Laurendeau Group Test of General Intelligence
Lorge-Thorndike Intelligence Tests
Otis Quick-Scoring Mental Ability Tests
Otis-Lennon Mental Ability Test
Peabody Picture Vocabulary Test
Progressive Matrices
Thurston Primary Mental Abilities
Wechsler Preschool and Primary Scale of Intelligence

Barik & Swain, 1976
Barik & Swain, 1978
Ben-Zeev, 1977(a)
Ben-Zeev, 1977(b)
Bruck, 1978
Bruck et al., 1973
Cummins, 1977
Cummins & Gulutsan, 1974
Kittell, 1963
Lambert & Tucker, 1972
Peal & Lambert, 1962
Tsushima & Hogan, 1975

Second, some researchers include standardized tests of intelligence as a covariate or control variable; in some cases the same test is used at different time points as both a control variable and a dependent variable, while in other cases one or more different tests are used as covariates. In these twelve studies, it was frequently a test or subtest of nonverbal intelligence that was used as a control measure; in particular the following:

Lorge-Thorndike Intelligence Tests
Progressive Matrices
Wechsler Intelligence Scale for Children (WISC)

These various tests, whether used as dependent measures or control measures, involve quite a variety of intellectual activities, making it difficult to generalize across the studies.

A third difficulty is that bilingualism is defined or measured differently from study to study (see page 3). For example, Kittell's sample included children from a bilingual environment and picked up fifteen different languages. Peal and Lambert, on the other hand, used several strategies to carefully measure and choose balanced French/English bilingual children. Other studies such as those done by Barik and Swain, and Lambert and Tucker chose the bilingual sample from children enrolled in bilingual programs and the monolingual sample from those enrolled in regular programs. Some studies include children who are balanced bilinguals while others include children at various stages of becoming bilingual.

Fourth, many standardized intelligence tests require the use of language which means that certain assumptions must then be made about the nature of intelligence. This is difficult, since the relationship between intelligence and language is not well understood. It is also confusing, because, in some studies, the language of the test is the first language of the bilingual sample, while in other studies it represents the second language.

And finally, as some of the investigators point out in their papers, it is not a simple matter to determine whether it is bilingualism that produces a higher level of intellectual functioning or whether it is the more intelligent children who ultimately become bilingual or who enroll in bilingual programs.

Notwithstanding these limitations and considering the statistical results for the various tests and subtests for the twelve studies as a whole, the intellectual functioning of bilingual and monolingual elementary school age children frequently does not differ. However, in cases where statistical differences were found, the bilinguals were more often the superior group than the monolinguals.

Peal and Lambert used several measures of verbal and nonverbal intelligence to compare ten-year-old balanced French/English bilinguals with monolinguals and found that bilinguals were better in several instances and that the monolinguals were never better. They categorized the nonverbal tests into (a) those with spatial-perceptual requirements, and (b) those with symbolic reorganization requirements -- concept formation or symbolic "flexibility" and found that the bilinguals performed better on the latter. They then proposed several hypotheses to explain the findings:

> People who learn to use two languages have two symbols for every object. From an early age, bilinguals may be forced to conceptualize environmental events in terms of their general properties without reliance on their linguistic symbols. ... This ability to think in terms of abstract concepts and relations, independent of the actual word, apparently is required in the symbolic reorganization type tests. ...
>
> bilinguals may have developed more flexibility in thinking. Compound bilinguals typically acquire experience in switching

> from one language to another, possibly trying to solve a problem while thinking in one language, and then, when blocked, switching to the other. This habit, if it were developed, could help them in their performance on tests requiring symbolic reorganization since they demand a readiness to drop one hypothesis or concept and try another. ...
>
> The bilingual child has been exposed to a wider range of experiences than the monolingual, because his experiences stem from two different cultures. This enriched environment may benefit him on nonverbal tests.
> (Peal & Lambert, 1962, pp.14-5)

Peal and Lambert also reported that the structure of the intellect of the bilinguals appeared to be more diversified than the monolinguals and that they were better on the verbal subtests. However, they did not control for intelligence at the outset and finally concluded:

> It is not possible to state from the present study whether the more intelligent child became bilingual or whether bilingualism aided his intellectual development, but there is no question about the fact that he is superior intellectually. In contrast, the monolingual appears to have a more unitary structure of intelligence which he must use for all types of intellectual tasks.
> (Peal & Lambert, 1962, p.20)

Barik and Swain, Cummins and Gulutsan, and Kittell report advantages for grades five and six bilingual children on various tests and subtests referred to as verbal intelligence, general reasoning, fluid intelligence, language intelligence and nonlanguage intelligence. Two of these studies found that the same children at lower grade levels either did the same as the monolinguals or were at a disadvantage. One study controlled for initial intelligence. Bruck found that learning disabled students in a French immersion program were similar to learning disabled students in a regular monolingual program in verbal intelligence but better in nonverbal intelligence. Ben-Zeev found bilinguals better on one of four subtests of the WISC that required the children to scan the details of a picture to check how it might deviate from an internal model of what the picture ought to include.

In both of Ben-Zeev's studies (for one of which she used WISC I.Q. as a control) monolinguals did significantly better than bilinguals on the Peabody Picture Vocabulary Test. Bruck et al. also found one cohort of monolinguals better than bilinguals on a subtest requiring children to select from five pictures the one that corresponded to a word presented orally. Tsushima and Hogan found that their sample of Japanese/English bilinguals in a monolingual school program had, at grade five, fallen behind their monolingual English counterparts in verbal intelligence, while remaining equal in nonverbal intelligence.

Associating Words

A word association test has been employed by a few researchers to compare bilingual and monolingual children or bilingual program and monolingual program children. The test consists of a series of words (sometimes presented in one language, sometimes in both) to each of which the child is requested, upon presentation, to say the first word that comes to mind. The researchers define and classify the responses in different ways and even interpret the results somewhat differently. The following response classifications have been used to analyze the responses:

Ben-Zeev, 1977(a)
Ben-Zeev, 1977(b)
Bruck et al., 1973
Cacco & Tucker, 1976
Edwards & Casserly, 1976
Genesee, 1978(b)
Lambert & Tucker, 1972

Syntagmatic
Paradigmatic
Rhyming
Transformations
Idiosyncratic
Different
Nonresponse (blank)
Other Language
Clang
Semantic Clusters

Genesee has described the first five as follows:

> Syntagmatic responses are those where there is a syntactic link between the stimulus word and the response given (e.g., bird - flies; red - flower). Paradigmatic responses are those which (1) are of the same grammatical class as the stimulus word (e.g., red - brown), and (2) cannot be linked by a determiner to form a commonly occurring verbal sequence. Other categories included rhyming responses (e.g., say - day),

> transformations (kill - killed), and idiosyncratic responses (street - four).
> (Genesee, 1978(b), p.34)

The next three classifications have been described as follows:

> ... for each stimulus word in English and in Tagalog, the number of different responses were tabulated. Various forms of the same word were counted separately (e.g., sit, sitting, sat). The number of different responses per stimulus item is one measure of response diversity or stereotype. Next, the number of blank responses (i.e., the number of Ss who gave no associate to a particular stimulus) was counted. Third, the number of "other-language" responses was tabulated. This measure represents the number of Ss who respond to a particular stimulus in language A with a response from language B (e.g., the Tagalog response mababaw to the English stimulus deep).
> (Capco & Tucker, 1976, p.159)

Ben-Zeev defined a "clang" response as an immature type of response that indicated the association task was especially difficult for a child. Lambert and Tucker defined "semantic clusters" as responses that are semantically related to the stimulus word but not syntagmatic or paradigmatic (e.g., eat - plate).

On the whole, the studies show that bilingual, or bilingual program children, performed much the same as monolingual, or monolingual program children, in the early elementary grades when equal in intelligence and socio-economic ratings. There was some tendency for bilinguals to respond with fewer rhymings, fewer transformations and more paradigmatic responses which, according to some authors, is an indication of a more mature approach to associating words.

Separation of Word Sound from Word Meaning

Ianco-Worrall designed an experiment to test whether bilingual children separate word sound from word meaning earlier than unilinguals. The experimental sample consisted of Afrikaans/English bilingual children ranging in age from four through nine years. Each bilingual was paired to two unilingual children, one Afrikaans speaking, the other English speaking, matched on intelligence, age, sex,

Ianco-Worrall, 1972
Purbhoo &
Shapson, 1975

school grade, and social class. The semantic and phonetic preference test consisted of eight verbally presented, one-syllable sets of words in two language versions. Each set was made up of three words. One word was the standard word, the other two were choice words. One choice word was phonetically related to the standard -- the two words shared the same sound in word-initial position. The second choice word was semantically related to the standard. The child was told: "I have three words: cap, can and hat. Which is more like cap, can or hat?" Defining bilingualism as dual acquisition of language in a one-parent, one-language home environment (i.e., one parent spoke only Afrikaans to the child, the other spoke only English), the author wrote:

> The conclusion we draw is that bilinguals, brought up in a one-person, one-language home environment, reach a stage in semantic development, as measured by our test, some 2-3 years earlier than their unilingual peers. A high percentage of these bilingual youngsters perceived relationship between words in terms of their symbolic rather than their acoustic properties ...
> (Ianco-Worrall, 1972, p.1398)

Purbhoo and Shapson came to a similar conclusion for a sample of Italian/English bilingual kindergarten children in Toronto. However, they did not formally assess bilingualism as did Ianco-Worrall, so the bilingual group reflected a variety of linguistic abilities. They also used a less stringent criterion for determining the preferences (semantic or phonetic) of the children and their monolingual counterparts.

Sensitivity to Language Sound Systems

Davine et al., 1971
Cohen et al., 1967
Lambert & Tucker, 1972
Lerea & Kohut, 1961
Lerea & LaPorta, 1971

Are bilinguals more sensitive to language sounds than those who are monolingual? Lambert and Tucker compared early elementary grade children in a French immersion program and monolingual children on their abilities to discriminate the phonemes of Russian, a language totally foreign to all involved. Each child heard fifty-three pairs of Russian syllables tape-recorded by a Russian-speaking linguist. The child, listening through earphones, had to decide if the two sound sequences heard in a pair were the same or different. While the bilingually instructed children in grades one, two and three consistently made fewer errors on the test than the monolingually instructed children, the differences were not statistically significant. At the fourth grade, Davine et al. attempted to assess the same children more thoroughly. The new procedure made use of a broad range of phoneme sequences, some occurring at the start of both French and English words; some found in French, but not in English words; some found in English, but not French words; and some occurring in neither English nor French words. The results indicated that the bilingually instructed grade four pupils had developed a sensitivity for second language sound sequences, but it was not a generalized facility. That is, the bilinguals were no more sensitive than the monolinguals on sequences occurring in neither English nor French words.

These phoneme sequences had been prepared by Cohen et al. who used them for a similar study involving five groups of university students of similar age and academic capacity: (1) monolingual English, (2) English/French bilingual but native in English, (3) English/French bilingual but native in both, (4) English/French bilingual but native in French, (5) monolingual French. The hypothesis that the bilinguals would have superior transfer accuracy was supported in general but not in detail. That is, the three bilingual groups ranked better on sequences occurring in neither English nor French than the two monolingual groups, but only two bilingual groups were significantly better than only one monolingual group.

Lerea and Kohut tested bilingual and monolingual children ranging from nine through eleven years and matched in age, intelligence, sex and socio-economic status on a verbal learning task involving seven Hebrew characters presented visually and auditorially. The bilinguals learned and relearned the task significantly more rapidly than the monolinguals.

Finally, Lerea and LaPorta required bilingual and monolingual adult subjects to learn two lists of nine disyllabic Hebrew words. Each word contained the /x/ phoneme. One list was presented visually, the second orally. The monolinguals learned the words more quickly when the lists were seen, whereas those bilinguals who had learned a second language in school after the age of thirteen performed significantly better auditorially and learned the correct pronunciation of the /x/ more rapidly than the monolinguals and those bilinguals who had mastered both of their languages in childhood. The authors conclude:

> The performances of both bilingual groups were superior to the monolingual group. The richer repertoire of sounds which the bilinguals possess may have enabled them to learn the target phoneme more quickly than the monolinguals. (Lerea & LaPorta, 1971, p.300)

The Influence of the Vernacular Versus a Second Language

Collison, 1974
Ehindero, 1980
Stern & Ruble, 1976

These three investigations have focused on concept formation and cognitive development from a different perspective. Simply put, they have attempted to determine whether children learn new concepts more readily and function at higher cognitive levels in their own vernacular than they do in the second language, English.

The purpose of Ehindero's study was twofold: (1) to determine if instructing children in science in their mother tongue (Yoruba) was any more efficacious than instructing them in science in the English language, and (2) to assess and compare the levels of cognitive development of Yoruba-speaking Nigerian children instructed in Yoruba and those instructed in the English language within a science context. At the time of the study, subjects in both the experimental and control groups had completed approximately six years of instruction in elementary science in the Yoruba and the English languages. The groups were equivalent in both educational and socio-economic background. Cognitive outcomes were assessed by a science achievement test, the items of which conformed to the six categories of Bloom's taxonomic levels of knowledge, comprehension, application, analysis, synthesis, and evaluation. Levels of cognitive development were assessed and compared by performance on four Piagetian concrete and formal tasks. The tasks were conservation of volume using clay, conservation of displacement volume, and proportional and syllogistic reasoning. The language of testing and interviewing seems to have been Yoruba, but the English form of the tasks was made available on demand by the children. There was no difference between the two groups on science concepts that required low-level cognitive skills. However, the experimental group (those taught science in Yoruba) scored significantly higher on science concepts that required the use of higher-level cognitive skills. And, when levels of cognitive development were assessed through performance on four Piagetian tasks, the experimental group was found to be at a higher level.

Collison's study was of Ghanaian grade six children whose native languages were Ga and Twi. The children had studied English in school for about six years. Collison empirically examined the concept attainment of the children as they functioned in their vernacular and in English. Groups of Ga-speaking and Twi-speaking children were each divided so that some received the material in English first and some in the vernacular first. The first part of the instructional method consisted of activities and investigations with the potential to lead children to significant discoveries about scientific phenomena. The second part took the form of a colloquium where children spoke and thought together. The second part generated untutored statements that could be analyzed according to conceptual level. For each language, two trained listeners coded transcriptions of the lessons according to four characteristics: (1) the number of statements made by each pupil, (2) level according to Vygotsky's theory of conceptual development, (3) relationships reported among objects or events, and (4) models. The author summarized the results as follows:

> The bilingual problem explored from the conceptual perspective reveals consistently that when English is the language of education, the majority of the experimental subjects were not able to exercise their conceptual potential. On the other hand, the vernaculars, Ga and Twi, were more fruitful media for enhancing the language-thought interaction.
>
> The quantitative data indicate that when children used the vernacular as opposed to English, they made more statements, their statements were more often at the complex and preconceptual level, they reported more relationships based on non-obvious linkages, and they used models more frequently. The qualitative data suggest that the vernacular statements were also structurally more complex, involved more dimensions simultaneously, and more free of error. There was also less language switching in the vernacular than in English.
> (Collison, 1974, pp.454-5)

Stern and Ruble also examined the effect of language of instruction upon the ability to acquire and utilize concepts but, in contrast to the two studies described above, found little evidence to support instruction in the vernacular. The children were of Mexican descent and spoke almost no English upon entering school. The basic conceptual task was the use of compound adjectival modifiers where the individual adjectives were relatively familiar. The authors concluded:

> Three related issues were explored. The first was concerned with whether the child will learn new concepts more effectively when

> presented in his own language; the second was concerned with the effect of the first learning experience on new learning in English; and third with comprehension in the native language of the concepts learned in English. While the study described in this paper was admittedly a very limited one, there is no basis to assume that a more protracted learning sequence would produce differences favoring instruction in the native language. It seems more logical to assume that extended instruction in English would tend to develop increased proficiency in that treatment.
> (Stern and Ruble, 1976, p.182)

Summary

The following points may be gleaned from the material reviewed in this section, keeping in mind that bilingualism is defined and measured in many different ways in these studies and that the tests may not be measuring what the investigators claim they measure:

(1) The majority of studies suggest that bilingualism is not a detriment to divergent thinking. In fact, for older children and for children who are balanced bilinguals, bilingualism may be related to a higher level of creativity. Therefore, learning a second language may provide practice in such activities as assimilating, adapting, accommodating, being flexible, freeing the mind and hypothesizing.

(2) The majority of studies suggest that bilingualism is not a detriment to analytic thinking and problem solving.

(3) The experience and social interaction involved with becoming bilingual may accelerate intellectual development as defined by Piaget.

(4) Bilinguals may be more adept at naming and renaming objects.

(5) Bilinguals may be more sensitive to feedback cues.

(6) Comparing bilinguals and monolinguals using standardized tests of intelligence is a complicated matter. However, the most frequent result of such testing and comparing is that of no difference. If advantages do favor the bilinguals, they may not be visible for those

children in early elementary grades.

(7) There may be a tendency for bilingual children to respond more maturely on tests involving word association than monolingual children, but on the whole they perform the same.

(8) Two studies suggest that bilingual children may separate word sounds from word meanings earlier than monolingual children.

(9) Bilinguals may be more sensitive to sound systems of foreign languages than monolinguals.

(10) Two studies suggest that bilingual children may learn new concepts more readily and function at higher cognitive levels in their own vernacular than in their second language.

Self-Concept

Many educators, trustees and parents believe that bilingual programs (particularly for minority group children) are important for enhancing self-concept. The following statement in a report of the Toronto Board is an example:

> A firm sense of identity and self-respect requires roots -- a sense of loyalty towards one's ancestors and appreciation of one's heritage. And such self-respect is a necessary condition to promote genuine respect for others different from oneself. Programs which enhance students' languages throughout their school careers are those which actively demonstrate a school's forthright recognition, endorsement, acceptance and support of their identity. This learning places the student in a strong psychological position to take full advantage of all the educational opportunities available in the school. For that reason alone, the provision of programs that enhance a student's own language is simply sound educational policy.
> (Toronto Board of Education, March, 1982, pp.2-3)

Given the prevalence of such beliefs, it is extraordinary that so few researchers have elected to study self-concept as a dependent variable in the context of bilingualism and bilingual school programs.

The self-concepts of Puerto-Rican, Punjabi and Italian children in early elementary bilingual programs (see pages 8, 15 and 35) in Canada and the United States have been studied by three investigators. In each case the children were compared with similar children attending regular English monolingual programs. Of the four self-concept measures (self-rated and teacher-rated) used in the three studies, the bilingual program children scored significantly better than regular program children on two measures but the same on the other two.

Moody, 1974
Plante, 1977
Purbhoo & Shapson, 1975

Two other investigations have been of English-speaking children in Canadian French immersion programs. In both instances, the self-concepts of the children were reported as normal, as this quotation from one paper indicates:

Lambert & Tucker, 1972
Crawford, 1984

> There was no evidence at any point that the children's self-concepts were confused or different, relative to the Controls; at all grade levels the Experimental children described themselves in optimistic and healthy terms. (Lambert & Tucker, 1972, p.206)

Summary

Bilingual programs for minority group children may enhance self-concept; however, researchers have rarely considered this variable.

Classroom Behavior

Moody, 1974
Plante, 1977
Purbhoo & Shapson, 1975

Few researchers of bilingual education have given their attention to measuring variables that might be classified under the rubric "classroom behavior", and only one has reported results that strongly favor bilingual education over monolingual education. The Connecticut "pairing" model for Puerto Rican children has been described on page 35. In a study of that program, Plante had trained observers rate the positive and negative behavior of the children and reported that:

> The control group manifested more negative behavior than their experimental group counterparts. Specifically, the experimental group manifested less of such behavior as inappropriately speaking out, being inappropiately quarrelsome or argumentative, getting into fights, bullying other students, and provoking hostility. (Plante, 1977, p.427)

Two Canadian investigations of bilingual education for young school-age children, one for Punjabi children in Vancouver (see page 15), the other for Italian children in Toronto (see page 8) included measures of classroom behavior such as attending to directions, participating in discussion, engaging in study, daydreaming, talking to peers, fiddling with objects, playing alone, contacting adults and cooperating with peers. On the whole, the classroom behavior of the bilingually educated children did not differ from that of similar children in regular programs.

Summary

Two of three studies that considered classroom behavior found that children in bilingual programs behaved much the same as similar children in monolingual programs.

School Attendance

Only three researchers mention school attendance in their studies of bilingual education. In two instances, there is little evidence to indicate that young children enrolled in bilingual education programs attend more regularly than their counterparts in monolingual English programs. One study was of Punjabi children in Vancouver, the other of Spanish-speaking children in San Antonio, Texas.

Cohen, 1975
Moody, 1974
Pryor, 1967

The third study of Mexican-American children in the Redwood City Bilingual Project (page 7) found positive effects:

> Bilingual schooling appeared to have a most healthy effect upon school attendance and upon attitudes toward school. The Bilingual students at the Pilot and Follow Up II levels had significantly fewer absences during both school years of the study than did the Comparison students. This finding is particularly relevant, since a number of administrators remark that they could solve the problem of educating the minority students better if they could only get them to attend classes more regularly. It appears that the Bilingual Project provides an incentive for the Mexican American minority student to come to school. (Cohen, 1975, p.257)

Summary

Two of three studies that considered school attendance found no effects on school attendance that could be attributed to a bilingual program.

Student Orientation, Attitudes and Motivation

In the 1950's and 1960's, Gardner and Lambert and colleagues of McGill University suggested a psychological theory of second-language learning that they and others have used to attempt to explain results of bilingualism and bilingual programs. In their words, the theory states that:

Anisfeld & Lambert, 1964
Anisfeld & Lambert, 1961
Carey & Cummins, 1983
Gardner & Lambert, 1972
Genesee, 1978
Genesee et al., 1977
Lambert & Tucker, 1972
Lambert et al., 1963
Peal & Lambert, 1962
Shapson & Kaufman, 1978
Swain & Lapkin, 1977
Tucker et al., 1976

> ... an individual successfully acquiring a second language gradually adopts various features of behavior which characterize another linguistic and, as is often the case, another cultural group. The learner's ethnocentric disposition and his attitude toward the other group are believed to influence his success in learning the new language. His motivation to acquire the language is considered to be determined both by his attitudes toward the other group and by his orientation toward learning a second language. The orientation takes an "instrumental" form if the purposes of language study reflect the more utilitarian value of linguistic achievement such as getting ahead in one's work, and an "integrative" form if the student is oriented toward learning more about the other cultural community, as if he were eager to be a potential member of the other group. Furthermore it is argued that some individuals may be prone to learn another language as a means of potential acceptance in another cultural group because of dissatisfactions experienced in their own group, while others may be as seriously interested in another culture as they are in their own. As one becomes proficient in a second language he may find that his place in his own membership group changes at the same time as the other linguistic-cultural group becomes more than a reference group for him. It may become a second membership group for him. His new position may become a marginal one, accompanied by feelings of chagrin or regret as he loses ties in one

> group coupled with the fearful anticipation of entering another. (Lambert et al., 1963, p.358)

In the Philippines, English is a prestigious and official language; it is the language of the business world, frequently the medium of instruction in schools and the language of upward mobility. In this context, Gardner and Lambert did a correlational study of high school students living in Manila who had completed about six years of formal training in English as a subject matter and had had English as the medium of instruction since grade three. They found that those students who approached the study of English with an instrumental outlook were most successful. These students had a desire to gain social recognition or economic advantages through knowledge of English; they wished to gain benefits of a noninterpersonal sort.

Similarly, two groups (elementary and advanced) of American students attending the McGill French Summer School were more likely to give instrumental reasons for learning French than integrative reasons. Many of the subjects were interested in becoming teachers of French or in improving their teaching skills. Also, for the elementary group, students with favorable attitudes toward France, a willingness to identify with French people, and a capacity to modify meanings of French concepts were most likely to do well in the French course. For the advanced group, an increase in pro-French attitudes was positively related to achievement. The authors reported that anomie increased for both groups (for the advanced group, anomie was highly correlated with favorable attitudes toward the French) and suggested that students in such a course become psychologically marginal between two linguistic-cultural groups.

For Anglo children in Canadian immersion programs, orientation toward learning French may differ according to location. Results from three studies suggest that children in Quebec are instrumentally oriented while those in Vancouver are integratively oriented. Those in Quebec may feel that French is more necessary for future jobs and community participation than those in Western Canada.

Anisfeld and Lambert studied Jewish children learning Hebrew in two very different districts of Montreal. For children in Westmount whose parents were second-generation North Americans and were economically and socially secure, an instrumental orientation was a predictor of achievement in Hebrew. These children thought in terms of becoming rabbis or Hebrew teachers and in engaging in other Jewish professions. These grade eight and nine students had been attending a wealthy Jewish afternoon school since grade one and received four hours of instruction in Jewish subjects a week.

In addition to assessing orientation to second language learning, measures of attitude have also been used in these studies. For example, Anisfeld and Lambert used an anti-Semitism scale and reported that anti-Semitic attitudes were a predictor of achievement in Hebrew for children in Outremont whose parents were first generation North Americans still bearing traces of old-fashioned Jewish background. Apparently, the children were striving to free themselves from this background.

Findings from the other studies that have employed measures of attitude toward the target language and its speakers suggest three themes. First, students who have positive attitudes toward the target language and its speakers perform best in acquiring the target language. Secondly, students who enroll in bilingual programs and/or become bilingual have more positive attitudes toward the target language and its speakers than others. And thirdly, students who fail to identify with any linguistic group experience the most difficulty in language learning. Elaborating on this last point, Peal and Lambert reported that 10-year-old monolingual French-speaking children achieved best in English when they closely identified themselves with both linguistic groups and most poorly when they failed to identify with either. Similarly, Carey and Cummins found that Edmonton teachers rated the academic cooperation and classroom participation of francophone and anglophone grade five students more favorably than mixed, francophone/anglophone students. The authors' comments related to this finding are interesting:

> The differences between the Mixed group and both French and English groups in terms of academic cooperation suggest that some individuals within the Mixed group may have ambivalent or negative feelings in relation to their usage of French and their attendance at French-medium schools. There are no differences between the groups in either IQ or English academic achievement (CTBS and cloze tests), thus the differences noted by the teachers seem likely to be specific to the children's attitude towards French. Although the Mixed group in the present study is not a homogeneous group, approximately one-third of the children reported that both parents spoke French most

> of the time to them but that they spoke English most of the time to their parents. This pattern shows the strength of the assimilation process and suggests that the relative lack of academic cooperation among some members of the Mixed group as perceived by their teachers may be related to conflict between francophone and anglophone roles and identities and, hence, the status of French as a language of communication.
> (Carey & Cummins, 1983, pp.165-6)

Various investigators have approached the topic of attitudes from a different perspective; they have asked the question, "What are the effects of bilingual programs on the children's attitudes toward the target language and its speakers?" In the majority of cases, the answer to the question is that the children who have participated in the bilingual programs have more favorable such attitudes than their counterparts in regular programs. Five of these studies have been of Anglo children in French or Spanish immersion programs. Of the Spanish immersion children, Cohen wrote:

Cohen, 1974
Cohen, 1975
Lambert & Tucker, 1972
Shapson & Day, 1982
Shapson & Kaufman, 1978
Swain & Lapkin, 1977

> ... the Experimental group was significantly more positive toward Mexican cultural items (Mexican flag, Mexican boy, tortilla, etc.) than was the Comparison group, while the Comparison group was significantly more positive toward Anglo culture items (American flag, American boy, bread, etc.)...
> (Cohen, 1974, p.98)

The study of French immersion children in Quebec is particularly interesting. Lambert and Tucker measured attitudes over a period of three years and found the immersion students had more favorable attitudes toward the French except during the year of the FLQ crisis. They wrote:

> It was important therefore to test the children again in 1971 after the social nightmare of the 1970 kidnappings and the menacing demands for secession were quelled, at least temporarily. Thus, in the spring of 1971 when the Pilot Classes were in grade V and the Follow-ups in grade IV, the children were asked, through a comprehensive, interview-type questionnaire, for their attitudes

> toward French Canadians and toward the European French. At this time, we find that the Experimental children have unmistakably more favorable attitudes toward French-Canadians and European-French people than do the English Controls; the Experimentals also give various signs that they are much more closely identified with French people and the French way of life. After five years in the program, then, we were delighted to see that the children had broadened and liberalized their perceptions of the other ethnic group to the point that they, relative to the English Controls, thought of themselves as being both English- and French-Canadian in outlook. We consider this outcome to be at least as important as the mastery of the other group's language.
> (Lambert & Tucker, 1972, p.206)

In a few studies, children in bilingual programs, when compared with children in regular programs studying the target language as a subject, have been shown to be more comfortable, willing and confident about using the language as well as happier about using it.

Cohen, 1975
Genesee, 1978
Muller et al., 1977
Shapson & Day, 1982
Shapson & Kaufman, 1978
Swain & Lapkin, 1977

In seven investigations, six of which are of Canadian French immersion programs, children were asked how they liked the bilingual program. In all cases, the majority gave positive responses such as wanting to continue, recommending it to younger siblings and liking the challenge.

Genesee, 1978(a)
Genesee et al., 1977
Lambert & Tucker, 1972
Muller et al., 1977
Shapson & Day, 1982
Shapson & Kaufman, 1978
Swain & Lapkin, 1977

Finally, a paper by Gulutsan discusses data collected by Lavallée for a Master's Thesis at the University of Alberta. Lavallée identified those students in a bilingual French/English junior and senior high school who claimed to know an additional language well enough to maintain a casual conversation in it. He compared the trilinguals with bilinguals in a number of attitudinal and motivational measures. Lavallée found that the trilinguals, in comparison with the bilinguals, expressed significantly more satisfaction with the French program in the school. They were also somewhat more intensely motivated for learning in a bilingual milieu and somewhat more integratively motivated. Then Gulutsan found that, among the trilinguals, those who had resided in a French community scored higher on the measure of motivational intensity.

Gulutsan, 1976

Summary

All but two of the seventeen studies reviewed in this section have been conducted by Canadian researchers, and the majority have been of Canadian subjects. These people have considered orientation, attitudes and motivation in a variety of research designs -- as correlational studies, as dependent variables when comparing types of programs, and as predictors for such variables as enrolling in bilingual programs and achievement in language learning. While more needs to be done in this area, these works suggest the following:

(1) Individuals differ in their reasons for learning a second language. They may do it to improve social status or job opportunities (an instrumental orientation) or they may do it to draw closer to another cultural group (an integrative orientation). This orientation may vary according to community, socio-economic status, language background or stage of language learning.

(2) Positive correlations exist between attitudes toward and/or identification with the target language and its speakers and variables such as motivation, enrollment in bilingual programs and success in language learning (achievement, confidence, use of language and satisfaction).

(3) Children who fail to identify with any linguistic/cultural groups may be most at risk in language learning.

(4) One study suggests that learning a second language may positively dispose children toward learning more languages.

Language Aptitude

In the studies selected for inclusion in this report, few have taken into account "language aptitude" either as an independent or a dependent variable. These three listed studied the variable in a correlational design; two performed factor analysis. In the study of Jewish children in Montreal, linguistic aptitude as measured by the Psi-Lambda Foreign Language Aptitude Battery correlated quite highly with Hebrew language achievement for all classes. However, for the other two studies (one done in the Philippines and one in Montreal), the Modern Language Aptitude Test was not as good a predictor of second-language learning as measures assessing orientation, attitudes and motivation (see preceding section).

Anisfeld & Lambert, 1961
Gardner & Lambert, 1972
Tucker et al., 1976

Summary

Two studies suggest that language aptitude may not be as important in second-language learning as attitudes and motivation.

Personality

A small collection of studies have considered personality. The perspectives of these studies are very different as illustrated by these four questions: (1) What are the personality characteristics of individuals who do well in bilingual programs? (2) What are the personality characteristics of individuals who should not be in bilingual programs? (3) Do the personalities of bilinguals differ from monolinguals? (4) Do the personalities of individuals in bilingual programs differ from those in monolingual programs?

Cummins, 1978(b)
Edwards & Casserly, 1976
Gardner & Lambert, 1972
Lambert et al., 1963
Lerea & Kohut, 1961
Macnamara et al., 1976
Swain & Burnaby, 1976
Tucker et al., 1976

Here again the evidence for answering each of these questions is scarce. Apropros of the first question, aspects of personality may not be as strongly related to achievement in a second language as aspects of attitudes, orientation and motivation. Quickness in grasping new concepts and perfectionist tendencies may be related to language achievement. The relationship of personality to achievement may be different for younger and older children. Success for older students may be associated with being adventuresome, assertive, conscientious and emotionally stable.

Two studies suggest that the answer for question two is that children who are shy, introverted and lack confidence should not be in bilingual programs.

Lerea and Kohut found no significant differences between bilinguals and monolinguals when they estimated social adjustment.

And finally, for the fourth question, Swain and Burnaby reported that kindergarten children entering French immersion programs were happier, more talkative and more perfectionist than children entering a regular program; while Edwards and Casserly reported that French immersion children in grades two and/or three were more reserved, assertive, tough-minded, vigorous, shrewd, conscientious and venturesome than children in a program with 75 minutes of French a day.

Summary

Aspects of personality such as self-confidence, perfectionism, assertiveness, adventuresomeness, and conscientiousness could be characteristic of children who enroll in bilingual programs and/or become bilingual. However, a great deal more research would be needed to establish such findings definitely.

Social Development

Edwards & Casserly, 1976
Macnamara et al., 1976
Purbhoo & Shapson, 1975

Few researchers of bilingualism and bilingual education have undertaken a study of variables that could be classified under the heading "social development". Edwards and Casserly employed the Vineland Social Maturity Scale one year but the next year eliminated it, because they judged the results not to be sufficiently relevant to research on second language programs. As a result of testing grades one and two French immersion children for one year, they concluded that at grade one, French immersion children were experiencing some lag in maturing socially but that at grade two no detrimental effects were obvious. The items of the Vineland Social Maturity Scale represent progressive maturation in self-help, self-direction, locomotion, occupation, communications and social relations.

Purbhoo and Shapson used an observation schedule and a modified sociogram and concluded that Italian children in a Toronto bilingual program (see page 8) had patterns of behavior and classroom interaction typical of their own age group in kindergarten and grade one.

Macnamara et al. used several research techniques to study French children attending English schools and English children attending French schools in the city of Montreal and concluded that in some ways the two situations differ. With respect to social development and relations, they wrote:

> ... English children seemed to stay more aloof in French schools than French children in English ones. English children tend to make friends more in their own linguistic group. There were more reports of enmities and animosities between the linguistic groups in the French schools, and the conflicts appeared to last longer. (Macnamara et al., 1976, p.130)

Summary

Social development as related to bilingualism and bilingual programs has not been a popular theme for researchers and therefore it is difficult to pinpoint a representative finding on the topic.

Language/Learning Disabilities

Bruck, 1978
Edwards & Casserly, 1976
Trites, 1976

The information on disabilities in the context of bilingualism and/or bilingual programs is fragmentary. Bruck chose samples of kindergarten children with language disabilities in French immersion classes and in English classes and compared them with children with normal language development in both types of classes until all were in grade three. The language-disabled children and normal-language children were matched on the basis of sex, age in months, classroom teacher and father's occupation. Bruck's purpose was to determine the feasibility of French immersion programs for the language-disabled children (those who in spite of physical well-being, normal intelligence and a healthy personality acquire language with painful slowness). After three years of extensive testing in mathematics, reading, spelling, abstract reasoning, grammar, intellectual functioning, and visual/auditory skills, Bruck concluded:

> ... results are extremely encouraging, for they suggest that children with language-learning problems who attend French immersion programs can develop linguistic, cognitive, and academic skills at a rate similar to that at which they would develop were they placed in an all-English classroom. (Bruck, 1978, p.65)

Edwards and Casserly had a different rationale for measuring learning difficulties in their study of primary children in French immersion; they wanted to investigate whether exposure to second language instruction leads to learning difficulties. Both English and French teachers rated the children, and the children were administered the Illinois Tests of Psycholinguistic Abilities and the Slingerland Screening Test. Generally speaking, the results of the study indicated that the French immersion program had no detrimental effects on the incidence of learning disabilities when compared with regular programs with French for 20 or 75 minutes a day.

Finally, Trites, from the Neuropsychology Laboratory at the Royal Ottawa Hospital, investigated the type of learning disabilities found in children who fail or do poorly in primary French immersion programs. A group of 32 primary French immersion children were selected along with seven comparison groups assembled from the neuropsychological files. All comparison groups were matched as closely as possible to the immersion group for age, sex and I.Q. Each child received an extensive individual neuropsychological assessment; the scores were then analyzed according to complex statistical analyses. The French immersion difficulty group had above average intelligence and higher performance levels on virtually all of the tests with one exception, a complex psychomotor problem-solving task. Trites interpreted the deficit on the Tactical Performance Test as a motivational lag in the temporal lobe region or a learning disability. After following some of the children who were switched to an English language program, Trites concluded:

> The follow-up testing indicated that children who have difficulty in French immersion accelerated in academic skills after they had been switched to an English language program. However, at the time of the first follow-up they were still below expected levels considering their age and ability. The results of this study do not support the view that the child who had difficulty in primary French immersion would have experienced the same difficulty in an English language program. Rather, the findings support the conclusion that some children, of above average potential and normal abilities for school progress in their native language, experience difficulty or fail in a primary immersion program in a second language as a result of a mild specific maturational lag.
> (Trites, 1976, pp.200-1)

Summary

Research on language/learning disabilities as related to bilingualism and bilingual programs is so limited that it is impossible to formulate generalizations.

Student Employment

A preceding section entitled "Student Orientation, Attitudes and Motivation" included reviews of some studies that suggested that enrolment and achievement in a second language program is frequently related to an instrumental orientation. That is, students who learn a language for the purposes of improving social status and/or career opportunities will be motivated to do well. Some obvious and intriguing questions then come to mind. Do graduates of bilingual programs use the second language? Do the graduates obtain better jobs or develop more rewarding careers? Do the graduates experience more upward social mobility? Given that answers to such queries require difficult longitudinal research efforts, it is unfortunate but understandable that they are rarely considered.

Popp, 1976

However, one study did take up similar questions. The bilingual program studied by Popp has been described on page 30; it is the K-13 French and English program in the Niagara South Board of Education. In that investigation, Popp responded to some parents and some students who were concerned that the bilingual program might in fact jeopardize job opportunities. He devised a job survey and collected responses from a small sample of grade twelve graduates from each of the bilingual school and an English-speaking school. The survey was designed to elicit information regarding the percentage of employed and unemployed persons, the nature of employment, and the extent to which French was used on the job. The only major difference in the employment characteristics of the two groups of students a few months after graduation was that several of the bilingually educated students used French at work while none of the English educated students did.

Summary

The effects of bilingual programs and bilingualism on student employment is an important, but unstudied, subject.

Parent Attitudes and Involvement

Of all the research literature reviewed in this report, not more than 10% deals overtly with the subject of parents, and for the research that does, the subject is frequently addressed as an aside or not considered as part of the formal research design. This is unfortunate, for no one could dispute that parents play an important role in the lives of their children.

Parents pioneered the St. Lambert French immersion program in Montreal and remained supportive in spite of uncertainties and difficulties. The role of the parents in this project is described in an appendix written by one of the parents. Here are three excerpts:

Cohen, 1974
Cummins, 1978(b)
Lambert & Tucker, 1972
Swain & Lapkin, 1977

> Some members of the group had generally more "instrumental" reasons for wishing their children to be bilingual. They wished the continuing progress and success of their children in a province progressively becoming more dominated by the French fact. Others considered bilingualism a personal asset for cultural, intellectual, and social reasons -- the so-called "integrative" motivation.
> (Lambert & Tucker, 1972, p.221)

> Though only eight people did most of the actual work, the efforts of the whole group at this stage were essential. Mutual reinforcement gave the members the courage and the will to continue against rather overwhelming odds. For most, this was a first experience with community action, and they found it unusually stimulating and often nerve-wracking. The specter of two hundred parents kept the administrators and board members uneasy too, and it was known that some of them were having severe nervous reactions to the group's forceful approach.
> (Lambert & Tucker, 1972, pp.224-5)

> ... the parents' group felt the full weight of responsibility for the success of the Experimental Class. They felt compelled to play a leading role in setting it up.

> They could hardly leave it in the hands of reluctant administrators who did not know exactly what was expected of them. It was an awkward, unprecedented role for parents, and understandably the administration felt threatened by it. However, there was not much choice for the parents' group. They found the teacher, one whom they had hired themselves for their winter classes, spent hours during the year encouraging her and the skeptical principal of the school selected for the experiment.
> (Lambert & Tucker, 1972, pp.226-7)

Other immersion programs such as the Spanish immersion program in Culver City, California (see page 38) and the late French immersion program in Peel County, Ontario have also been strongly supported by middle class Anglo parents. Cummins discussed the immersion program in Ireland and suggested that present day programs are more successful than previous ones largely because of parents' attitudes:

> Thus, among many parents, mainly in the Dublin area, there has been a renewal of interest in having their children educated through Irish. These parents are considerably more committed to the Irish language than many parents of children in earlier Irish immersion schools. ... In other words, many of the parents of children in earlier immersion schools would have held neutral or negative attitudes towards Irish and few would have spoken any Irish at home. In contrast many of the recent all-Irish schools were founded through parental pressure and parents are involved both in decision-making and in extra-curricular activities.
> (Cummins, 1978(b), pp.275-6)

Chesterfield, 1982
Edmonton Public Schools, 1979
Ewanyshyn, 1980
Muller et al., 1977
Veidt, 1976

The English/Ukrainian bilingual programs in Edmonton (see page 6), the English/German bilingual program in Cincinnati (see page 33), and the American Spanish/English bilingual Headstart programs are examples of children receiving some education through the medium of a heritage language. The authors discuss the influence and satisfaction of the parents. The parents of the English/Ukrainian program children felt the objectives of the program were appropriate and were being achieved and considered the program operation to be effective. These parents were particularly pleased because they felt their children were acquiring an appreciation of Ukrainian culture and, in the case of the Catholic School System, an understanding of the Ukrainian Catholic Rite. And, Veidt wrote the following about the parents in Cincinnati:

> ... there is one factor which, although difficult to calculate statistically, may have been functioning to the advantage of the bilingual pupils. Parents who enroll their children in an alternative program represent not a random sample of parents of elementary school students, but rather a highly select group who are vitally concerned about and involved in the education of their sons and daughters. Parental interest, enthusiasm, and commitment constitute an incalculable source of motivation for such pupils.
> (Veidt, 1976, p.49)

Two investigations examined the effect of numerous variables on children's success in learning a second language. Both shore up the notion that children with parents who support the learning of a second language do better than those with non-supportive parents.

Gardner & Lambert, 1972
Tucker et al., 1976

Two other studies compared samples of monolingual and bilingual 10-year-old French Canadian children on a number of variables. Both studies concluded that the parental attitudes of the two groups differed significantly and that they influenced the children's attitudes. Parents of bilingual children encouraged their offspring to learn the second language and had more favorable attitudes to the speakers of that language. These parents were also more likely than parents of monolingual children to make an effort to learn the second language themselves.

Anisfeld & Lambert, 1964
Peal & Lambert, 1962

Bilingual programs may also serve to change parent attitudes to and involvement in school and education. Of four San Antonio schools with Spanish/English bilingual programs, Pryor reports that the school with the most successful bilingual program had a far better attendance of parents at PTA meetings for the experimental group than for the control groups. Similarly, the Toronto program for Italian children (see page 8) also influenced the parents:

Cohen, 1975
Owens, 1972
Pryor, 1967
Purbhoo & Shapson, 1975

> The final goal was to help the parents become more involved with their children's education. ... While parents from the comparison group expressed as great an interest in the children's education, the General Mercer parents attended more official school functions and talked regularly with the teacher on an informal basis. These results illustrated that parental involvement can be affected by a transition program. Informal talks continued during the second year with a new teacher in charge of the transition program indicating that the common language rather than the teacher specifically was responsible.
> (Purbhoo & Shapson, 1975, pp.44-5)

Cohen described the effects on parents of the Spanish/English bilingual program for Mexican-American children in Redwood City (see page 7) as follows:

> Parents of the Bilingual Project group were significantly more positive about the effects upon their children's English language development of using Spanish as a medium of instruction in the classroom. They felt that the use of Spanish would either increase their children's learning of English or that their English ability would come out the same. Comparison parents tended to feel that use of Spanish in the classroom would either decrease, or have no effect on, their ability in English. Few Comparison parents, however, felt that use of Spanish would enhance the learning of English. This difference in views is striking. It lends further support to the contention that exposure to a bilingual program actually affects the views of parents.
> (Cohen, 1975, p.260)

Finally, in the Spanish bilingual preschool program described by Owens (see page 8), the children spent approximately two hours a day in a home learning environment containing five children and a home tutor.

Parents were actively involved in the learning activities and served as adult models for their children.

Summary

A rather limited collection of studies suggests not only that parent attitudes and involvement are important to children's attitudes to and achievement in learning second languages but also that bilingual programs may positively affect parent's attitudes to and involvement in education and second language learning.

Teacher and Principal Attitudes

The attitudes of teachers and principals have rarely been canvassed by researchers of bilingual programs. This omission is perplexing given that a major responsibility for making such programs work lies with the teachers, principals and administrators. One group of researchers ended a paper on teachers' views with these words:

> ... the investigators believe that the data strongly suggest that evaluators of innovative educational programs must examine carefully the repercussions of these programs not only on pupils and parents, but also on the teachers and administrators who are directly or indirectly associated with them.
> (Campbell et al. 1973, p.110)

Campbell et al. found quite a difference between English-speaking and French-speaking teachers in their opinions about an innovative French immersion program for English-speaking children. The French-speaking teachers were very favorable; they believed the children would become skilled in French, master course content, become sensitive to the values and traditions of French Canadians and would not lose their English skills. The English-speaking teachers disagreed on all points and also felt that the immersion program was receiving too much publicity. In spite of these differences, the two groups were interacting in the school with the immersion program; the francophone teachers had not become social isolates.

Campbell et al, 1978

Other evaluators report similar attitudes; for example:

Edwards &
Casserly, 1976
Lambert &
Tucker, 1972

> In summary, it would appear that the decisive factor in a teacher's attitude to the second language programs is not teaching experience, the size of school or class or the grade being taught but simply the position which a person holds. Principals are most hesitant about evaluating the programs positively and are the strongest advocates of revising the present curricula. The French teachers are almost unanimously favorable in their evaluation of the effectiveness of the second language programs. The English

> teachers tend to maintain a position between the two extremes. All agree on the high level of co-operation which exists in the schools, a situation which probably greatly enhances the children's learning of French and the transfer of what is learned in those classes to an English setting.
> (Edwards & Casserly, 1976, pp.378-9)

In the same study, principals, English teachers and French teachers all agreed that they, and not parents, should be the ones to determine the appropriate second language program for a child.

Lambert and Tucker found that the opinions of English-Canadian teachers about French immersion students varied. Some English teachers were amazed and delighted while others expected the children to be disastrously retarded and went out of their way to search for deficiencies.

The evaluators of the Edmonton English/Ukrainian bilingual programs (see page 6) solicited opinions of just the bilingual program teachers and principals. (No background information on the teachers and principals was reported.) In general, teachers and principals rated the objectives of the programs highly and felt they were being attained. The operation of the programs was judged as being effective and most wanted them to continue. Most of the teachers felt that the bilingual programs had had a positive effect on the students' appreciation of the Ukrainian culture, religion and/or Ukrainian Catholic Rite. Teachers wanted more Ukrainian language materials, guidelines, library books and inservice while principals wanted more money and special timetabling or scheduling arrangements. Some of the program teachers reported receiving less support from administration and non-program teachers than non-program teachers. Some also reported feelings of isolation from the non-program teachers.

Edmonton Public Schools, 1979
Ewanyshyn, 1980
Muller et al., 1977

Lapkin et al. studied French immersion programs in two different school settings: immersion centres housing only the immersion program, and dual-track schools in which both the immersion and regular English programs operated. The test results of Grade five students indicated superior achievement on the part of immersion centre students in some aspects of French and English skills. The authors suggest five possible reasons for the differences, one of which was slightly more favorable staff attitudes towards the immersion program in the immersion centres than in the dual-track schools:

Lapkin et al., 1981

> When asked to specify whether they would prefer to teach early French immersion in an immersion centre or a dual-track school, homeroom immersion teachers unanimously chose the immersion centre. This suggests that the dual-track school immersion homeroom teachers are not as satisfied about teaching in the immersion program in their schools as are their counterparts in the immersion centres. When asked to describe the atmosphere in their schools, 44% of staff in the immersion centres indicated that there was a compatible mix, or made a positive comment, compared with 30% in the dual-track schools. ... In addition, more staff in the dual-track schools indicated that they felt the atmosphere was segregated (17% versus 5% in the immersion centres).
> (Lapkin et al., 1981, p.84)

Further, principals and vice-principals in the dual-track schools reported more areas of administrative difficulty, in particular: staff relations, parents' demands, bussing and other transportation, and crowding in the schools.

Cummins, 1978(b)

Cummins surveyed infant and primary Irish immersion teachers in English-speaking areas of Ireland. The questionnaire was in Irish but Cummins provided no information on the background of the teachers. Most of the teachers felt that becoming bilingual confers intellectual advantages on children of above-average intelligence and would not hold back the intellectual development of children of below-average intelligence. Most felt that personal commitment to Irish was essential for children's progress in an all-Irish school and only 9% felt that it was psychologically healthier to fully develop a child's native language before starting instruction through the medium of a second language.

And finally, the teachers of the bilingual Spanish/English Headstart programs (see page 8) summed up their feelings as follows:

For English-preferring Hispanic children:

- Being aware of his Hispanic heritage and language will enable the child to develop in both English and Hispanic cultures.

For non-Hispanic children:

- The child can understand his Hispanic peers and there is a greater degree of interaction. The cultural differences would be understood without prejudice.

For Spanish-preferring Hispanic children:

- It is important for the native Spanish child to speak English in this country because more often than not, he will be confronted with only English-speaking persons in higher positions.

- Children get a better self-concept because they recognize that speaking Spanish is just as good as speaking English. This helps them learn not to be ashamed of their language.

(Chesterfield, 1982, p.16)

Chesterfield does not discuss the cultural background of the teachers interviewed but says that the majority spoke both Spanish and English.

Summary

There is a hint in this limited amount of research that teacher and principal attitudes may vary according to their language/cultural background and position in the school and that such attitudes may be related to the success of bilingual programs and the achievement of students in such programs. This subject should be more thoroughly investigated.

Teacher Employment

Approaches to staffing bilingual educational programs vary considerably but the solutions or arrangements as well as the characteristics of staff are not always documented by researchers and are rarely used as control or independent variables in the research designs. In fact, on the whole, a certain air of silence surrounds the topic of teacher employment. What is discussed here is an accumulation of bits and pieces of information gleaned from twenty-seven papers.

In most instances, it seems that Ontario and Quebec French immersion programs employed native speakers of French, although bilingual Anglophones or persons with nativelike command of French were also hired, particularly in Ontario. One must assume that the persons hired were qualified teachers but little information is provided. (Unqualified teachers were employed in the St. Lambert project, at some stages.) The teachers' country of birth, years of teaching experience and other languages spoken are scarcely touched on, although Lambert and Tucker mention that in one year they hired teachers from Belgium and North Africa who were French-speaking. Genesee pointed out that the native French-speaking teachers in the French immersion program in the Protestant School Board of Greater Montreal could also speak English. Lapkin et al. compared French immersion programs in two settings -- immersion centres housing only the immersion program and dual-track schools operating both immersion and regular programs -- and concluded the immersion centres were more successful partly because the teachers were more experienced and were better in communicating with the parents in English. Also, the principals and vice-principals in the immersion centres were more skilled in French. Three papers suggest that the job security of Anglophone teachers is threatened by the bilingual programs and that anxieties and negative attitudes can arise as a result. Here is an excerpt from one of the papers:

Barik & Swain, 1978
Barik et al., 1977
Bruck et al., 1973
Campbell et al., 1973
Genesee, 1978(b)
Lambert &
Tucker, 1972
Lapkin et al., 1981
Swain & Lapkin, 1977

> One comment on the Teacher Survey about an immersion centre where the regular English program was still in the process of being phased out suggests that this process can cause a certain amount of tension in the school: "Problems are occurring between staff because of redundancy at school level brought about by the growth of the immersion program."
> (Lapkin et al., 1981, p.84)

In the Montreal experiment in trilingual education or double immersion (see page 6), Genesee et al. point out that regular content courses were taught via French by native French-speaking teachers while religious and cultural subjects were taught via Hebrew by native Hebrew-speaking teachers.

Genesee et al., 1978

The Culver City Spanish immersion program (see page 38) employed Mexican-American teachers.

Cohen, 1974

Some bilingual programs rely exclusively on qualified teachers who are fluently bilingual. Many of these use concurrent simultaneous translation methods or alternate from one language to the other, sometimes repeating content. In some cases, the environment of the classroom is described as bicultural. The teachers themselves are often immigrants. Two Canadian programs are good illustrations. The description of the Punjabi/English program in British Columbia that was disussed on page 15 is concluded with this paragraph:

Legarreta, 1979
Moody, 1974
Pryor, 1967
Purbhoo &
Shapson, 1975
Trevino, 1970
Tucker et al., 1970

> The results of this evaluation suggest the children in the experimental class made gains in self-concept. The contributing factors are undoubtedly many, but the fact that they had an East Indian teacher is believed to be an important one. That these children have a culture as well as a language different from our own bears repeating. Perhaps the fact they gained in self-concept and through this kind of program they received an understanding of our culture without detriment to their own shows a step that must be taken before learning English can really be accomplished. The continuation of this program and the employment of an East Indian teacher, fluent in Punjabi and English, for this class is strongly recommended. (Moody, 1974, p.34)

The Toronto Italian transition program (see page 8) was staffed in an interesting manner:

> Both the teacher and her assistant were born in Italy, spoke both English and Italian fluently, and had experience with primary grade children though not at the junior kindergarten age. The teacher had studied the Italian language and was familiar with its formal or standard form, while the assistant

> spoke Calabresi, one of the more common Italian dialects. This minimized any difficulties in communicating with the children whose backgrounds consisted of dialect and the formal Italian. (Purbhoo & Shapson, 1975, p.9)

Unqualified personnel tend to shoulder a major responsibility in bilingual programs for groups that have few educated adults. The programs for Cherokee Indian children in Oklahoma, Aboriginal children in Australia and Indian children in Mexico have been presented on pages 13, 43 and 44. The project schools of the Cherokee Bilingual Education Program did not have bilingual teachers, so bilingual Cherokee Indian teacher aides were employed to work with the classroom teacher in a team effort to provide bilingual education for the Indian children. Bacon et al. provide little detail about the arrangement but the aides received training and were apparently effective. In the Milingimbi Bilingual Education Program, a trained non-Aboriginal teacher taught the English parts of the program and a partially trained or untrained Aboriginal teacher taught the Aboriginal language portion of the program. The Aboriginal teaching assistants had no prior teaching experience but held major teaching roles. Similarly, the bilingual schools of the National Indian Institute of Mexico recruited teachers from the local Indian populations. Modiano compares the teachers of the experimental group (the Institute schools) with the teachers of the control group (Federal and State schools) as follows:

Bacon et al., 1982
Gale et al., 1981
Modiano, 1968

> The teachers were recruited primarily from three groups. In the Federal and State schools, where all reading instruction was in Spanish, many came from the local mestizo population; they often had a cursory knowledge of the Indian languages but represented the element which had exploited them for decades; for the most part their relationships with the Indian communities were far from cordial. Most of the remaining Federal and State teachers were recent normal school graduates from other regions of the country; some came with missionary zeal, some were demoralized by the difficult living conditions they found, but none spoke the language of their students. As a group the

> Federal and State teachers averaged nine years of formal education; only one was a woman.
>
> Institute teachers who approached reading through the vernacular, were recruited from local Indian populations. When the first Institute schools were founded in 1952 many of the teachers were barely literate themselves. By the time of the field study the Institute was able to recruit new teachers from among its own graduates and had provided in-service education for the older teachers, so that, as a group, they now averaged six years of formal education. Many were still clumsy in their mastery of Spanish. Four of the 28 (14%) were women.
> (Modiano, 1968, pp.38-9)

The author concludes with these comments:

> The Mexican study also showed that teachers' ability to communicate with their students and their attitudes toward them may have outweighed their training or educational level. Would this always hold true? How far could these students have gone if the teachers had been more adequate? If we had to choose between bilingual aides and college educated teachers who cannot communicate with their students, who would be more effective? Further study is warranted.
> (Modiano, 1968, p.43)

Spolsky (1978) describes how a bilingual program can change the economic and political makeup of a community because of a need for different teachers:

> In the Navajo situation, the most important outcome of bilingual education is probably related to changes in the economic and political situation. In 1972, the 53,000 Navajo students in school, 90% of whom speak Navajo, were taught by 2600 teachers, only 100 of whom spoke Navajo. The decision to establish bilingual education, even a transitional variety for the

> first three grades, set up a need for a thousand Navajo-speaking teachers. Whatever effects this may have on the educational or linguistic situation, it is clear that it immediately offers the possibility of jobs within the community for a sizeable group of people. A thousand well-paying jobs on the reservation for Navajos would lead to a greater income not just for the teachers themselves but for the community as a whole and would immediately establish within the community a well-paid middle class whose potential infuence on political development of the Navajo nation is obvious. Whatever may then be the expressed goals of a bilingual education program, it is probable that its major effect will be in this area. The political effect of bilingual education is to assure not just development of this group but also community control of school and teachers and so the integration of the school into community life. (Spolsky, 1978, pp.357-8)

Some bilingual programs are staffed by two sets of trained teachers, each proficient in one language. Each is responsible for distinct language portions of the curriculum. This is true for these four bilingual programs for Moroccan and Turkish children in Holland, Finnish children in Sweden, Spanish children in Connecticut and German children in Cincinnati (see pages 12, 25, 33, and 35).

Altena & Appel, 1982
Löfgren & Ouvinen-Birgerstam, 1982
Plante, 1977
Veidt, 1976

The instructional staff for the first year of the Redwood City Bilingual Project (see page 7) comprised two bilingual Mexican-American teachers, one aide who had been an elementary school teacher in Costa Rica and another Mexican-American aide with a high school background. The Costa Rican aide left the project because she tended to assume the role of the teacher against the wishes of the master teacher and because she expected payment commensurate with her past training and experience. In the second year, there were two Anglo bilingual teachers, one Mexican-American bilingual teacher, one bilingual specialist and three Mexican-American aides. In the third year, another Mexican-American bilingual teacher was added as well as three aides; one a teacher from Bolivia, one an untrained person from El Salvador and one an untrained Mexican-American.

Cohen, 1975

Gaardner & Richardson, 1968

The Spanish/English bilingual program in Florida (see page 23) employed teachers who were native speakers of both languages. The native speakers of English were not bilingual. The native speakers of Spanish were experienced Cuban teachers and were bilingual. The Cuban teachers had completed a special course at the University of Miami. Aides were also hired; they were former Cuban teachers.

Owens, 1972

A home tutor and parents were used in the Spanish bilingual preschool program documented by Owens and discussed on page 8. No information is provided about the tutor.

Macnamara, 1966

Macnamara (see page 22) expressed concern that studies of bilingualism rarely controlled for teacher variables such as training, ability to teach and racial bias. Consequently, he took special precautions to guard against differences among the groups with respect to teaching training and skill. He provides few details about the teachers except to say that some were untrained.

Summary

Staffing bilingual programs is not always a straightforward matter. A school board may not have in its employ the necessary trained bilingual teachers and the community may not have a literate adult population. Various solutions have been tried. Trained bilingual teachers from the mother country or other countries with the same language have been hired. Two sets of teachers have been employed - one to deal with the instruction in each language. Trained teachers from the mother country have been hired as aides. Untrained people from within the community have been hired as aides. And, bilingual teachers of the dominant culture have been recruited.

Certain tensions may arise if regular staff feel their jobs and careers are threatened.

Researchers rarely control for teacher characteristics in their studies of bilingual programs.

Instructional Materials

Extensive searching through this set of research literature on bilingual programs brought to light only meagre information about instructional materials. Instructional materials are rarely considered as independent, dependent or control variables in the designs of the research studies.

These two French immersion primary programs in Montreal had curricula that closely resembled that followed by most school systems of Montreal. The books and materials were from Quebec and France. All the materials were designed for children who spoke French as a native language. The programs of study at each grade level focused attention on the development of expected academic skills with language made incidental, except for French Language Arts.

Bruck et al., 1973
Lambert & Tucker, 1972

This Ottawa primary French immersion program also made use of many French books and materials, but most appeared to have been published in Ontario.

Edwards & Casserly, 1976

Peel County in Ontario began their French immersion at grade eight and found that it was difficult to find materials appropriate to both the linguistic and cognitive levels of the students. They found the grade eight materials from Quebec conceptually appropriate but linguistically too sophisticated; consequently, the teachers prepared much of the materials themselves.

Swain & Lapkin, 1977

The Spanish immersion program in California (see page 38) had no special curriculum, materials or hardware. The Spanish immersion teachers simply observed and borrowed techniques from the conventional English kindergarten and first grade teachers.

Cohen, 1974

Some authors write briefly of the difficulties caused by the lack of materials in the heritage language. Bacon et al. felt the lack of curriculum materials utilizing the Cherokee language limited the early effectiveness of the Cherokee Bilingual Education Program. (See page 44.) In the years to follow, appropriate materials were developed by program personnel. In the Redwood City Project (see page 7), Cohen reported that finding instructional materials for teaching Spanish and for teaching the content subjects in Spanish was a real problem. In the first year, an aide translated some science lessons into Spanish but found it very time consuming. Translations of math concepts were made spontaneously and at times with difficulty. In the third year, the Mexican-American teachers were at a definite disadvantage because no Spanish materials were available for math and science. The Redwood City Project emphasized the importance of

Bacon et al., 1982
Cohen, 1975
Edmonton Public Schools, 1979
Ewanyshyn, 1980
Gale et al., 1981

the Mexican culture and therefore needed books, filmstrips, films and records to teach a bicultural social studies. In the second year, a commercial series on Mexican-Americans and project-developed slide-cassette packages on famous Mexican-Americans were available for use.

These two programs appear to have relied heavily on translated materials. Trevino (see page 59) reports that the English text books supplied by Texas were translated by the teachers and director for their Spanish/English program. The bilingual project in the Philippines (see page 11) used materials developed at the Science Education Centre at the University of Philippines for math, science and health. Since the materials were developed in English, a specialist was needed to supervise their adaptation to Pilipino.

Trevino, 1970
Tucker et al., 1970

Other investigators say that time and money had to be invested in the collection, production and purchase of materials but make few other comments. According to Pryor, the extent of the planning, organization of materials and availability of curriculum materials at the beginning of the year greatly influences the success of a bilingual program.

Chesterfield, 1982
Gaardner & Richardson, 1968
Purbhoo & Shapson, 1975
Pryor, 1967

Summary

Little is said about instructional materials in research studies of bilingual education; however, the information that is provided suggests that many difficulties such as translating existing materials, developing new materials and matching cognitive and linguistic levels are encountered.

This subject is rarely considered as part of the research designs.

Teaching Styles and Methods of Instruction

A serious limitation of this entire body of research literature on bilingual education programs is the lack of assessment and control of individual teaching styles and methods of instruction.

Three investigations of Canadian French immersion programs briefly refer to the natural way in which children are introduced to French. These programs begin by emphasizing French as a language of communication. The teachers aim at developing listening comprehension, vocabulary and spontaneous verbal expression while refraining from teaching formal language skills and making extensive corrections. For example, Bruck studied the suitability of early French immersion programs for language-disabled children and made this interesting observation:

Bruck, 1978
Genesee et al., 1977
Lambert &
Tucker, 1972

> One of the phenomena we have noticed in our clinical practice is that many language-disabled children cannot cope with a typical French-as-a-second-language program (typically given for 20 - 40 minutes a day several times a week); they leave school with almost no knowledge of French. This may be due to the fact that most of such programs are based on teaching methods (a great deal of memory work, repetition of language out of context, and the learning of abstract rules) which inadvertently exploit the weaknesses of the language-disabled child. The French immersion program does not seem to have this effect; rather it provides a more suitable and natural environment for these children to learn French.
> (Bruck, 1978, p.70)

Cohen described the differences between regular classes and bilingual Spanish/English classes as follows in the study of the Redwood City program (see page 7):

Cohen, 1975

> The Comparison group received conventional English-only instruction. However, almost half of these students also received special attention through ESL or Title I classes, or through individual tutorials. It was observed that the Bilingual students were instructed less as an entire class, and more extensively in small groups or individually, than were the Comparison students.
> (Cohen, 1975, page 124)

Veidt, 1976

Finally, Veidt (see program description on page 33) speculated about the effects of different teaching methods and how they might relate to achievement scores on tests used to evaluate the success of a bilingual program:

> Unlike the standard elementary curriculum in Cincinnati, the German-English Bilingual Alternative School selected materials for its basic reading instruction which evince a strong phonics base and emphasize word recognition and coding-decoding activities. This approach to the teaching/learning of reading in English corresponds to a large extent with the method chosen for the same task in German. However, those sections of the Metropolitan Achievement Test which are concerned with reading ability appear to test some elements not normally presented and learned in a first-grade reading program which has a phonetic-decoding orientation. This fact may have been instrumental in artificially depressing the scores of the first-grade bilingual group on the reading achievement portion of the posttest.
> (Veidt, 1976, p.49)

Summary

Bilingual education programs are usually evaluated by comparing them with regular educational programs, but this is nearly always done without assessing and controlling for teaching styles and methods of instruction.

There is enough in the five papers referred to in this section to suggest that these variables may matter and that they in fact cover a wide range of phenomena. Are the researchers evaluating bilingual and regular school programs or are they merely evaluating different teaching styles and methods of instruction? Do the researchers use tests that match one program more than another? Do other programs exist in the schools (such as remedial classes) that involve some children and not others?

Bilingual Education as an Intervening or Dependent Variable

Paulston (1978) has emphasized the importance of accounting for sociohistorical, cultural, economic and political factors that lead to certain forms of bilingual education when conducting evaluations and assessments. This could mean casting "bilingual education" as the intervening or dependent variable rather than as the independent variable in research designs. Paulston cites Swain on this matter:

> The reason bilingual education has been the independent variable is because educators, parents, etc., were worried about the possible harmful effects of bilingual education on their kids. The evaluations of the programs were undertaken to show that bilingual education was not harmful. In other words, research for immediate educational purposes necessarily has used bilingual education as the independent variable. Now if you want to develop a theory of bilingual education ... then you have to take one step backwards (no negative connotation meant) and view bilingual education as the/a dependent variable.
> (Cited in Paulston, 1978, p.191)

Only one study of this kind was located. The investigator assumed in this study that children's progress in a bilingual program was the result of an interaction between the bilingual program and community variables. McConnell chose two sites with opposite sociolinguistic environments. One site was in a Texas border area where Spanish was the dominant language of the community used for nearly all social and economic functions; for example, all the tradespeople and professionals like doctors and dentists spoke Spanish. The other program operated in Washington state in a rural community where Spanish speakers were in the minority and there were strong pressures for language shift because social and economic functions were carried on in English. In Texas, the children interacted most at home with their mothers, and this interaction was most often in Spanish. In Washington, however, the children most often interacted with siblings in the English language. The socio-economic and ethnic environments of the two sites were very similar -- migrant Spanish workers. There were also no statistically significant differences in the academic and language skills of the two groups of children as McConnell, 1983 they entered the bilingual programs. The Spanish/English programs in the two sites were parallel -- child/staff ratios, curriculum materials, timetables, staff training, staff qualifications and staff recruitment. The student outcomes measured were Spanish and English vocabulary, mathematics and English reading. Data were analyzed for differences according to site and length of program attendance.

The differences between sites were significant for all variables but most pronounced for English vocabulary. The acquisition of English vocabulary for the Washington group was very rapid for the first two years while in Texas it got off to a slow start. With respect to Spanish vocabulary, the Texas children were always higher because of the reinforcement of Spanish outside the program. McConnell wrote the following about the relative dominance of the two languages in the two sites:

> ... the average scores in English vocabulary are consistently higher than the scores in Spanish vocabulary for children in the Washington site. This is not true at the Texas site. ... All the children in this sample started out with a "test dominance" in Spanish. After one year, a fourth of the children in Washington tested higher in English compared to only 5% in Texas. By two years a majority of the children in Washington, almost two-thirds, tested higher in English than in Spanish and the percentage continues to rise with each attendance period. In Texas, too, a limited number of children tested higher in English than in Spanish after attending the bilingual program, but the percentage who changed "test dominance" was consistently much lower.
> (McConnell, 1983, pp.8-9)

For math and English reading the pattern of gains for each site were quite similar.

The differences according to length of program attendance were also significant for all variables. Each period of attendance for the bilingual programs produced marked increases in all variables in both locations:

> In math children entered the program very low at both sites; the average score would compare to the lowest 20 percent of children from the national norm group. ... The program was very powerful at both sites resulting in a rapid increase in math scores so that in one year children's average scores were in the "low average" range compared to national norms, and by two years attendance, their average scores were above average norms in both sites. ...
>
> In reading, it took two years attendance in a bilingual program for children's reading scores to reach the "low average" range. ... By three years their average scores were nearly at national norms, and by four years children at both sites had average scores which exceeded the national norms. ... (McConnell, 1983, pp.10-12)

Summary

McConnell's findings suggest that with socio-economic conditions and bilingual programs held constant, the sociolinguistic characteristics of a community can affect outcomes of bilingual education.

OTHER LITERATURE

The intent of this section is to briefly overview other bodies of literature and to suggest a few sources for those who wish to pursue the topics in more depth. This additional literature was not included in the present document because it was difficult to locate, poorly designed research, outdated research, inconclusive, marginally relevant, theoretical not experimental, and/or somewhat outside the area of education.

As mentioned in the Introduction, the 110 research studies reviewed in this document were conducted during the past twenty-five years. Research done prior to 1960 has been reviewed by others such as Darcy (1953 and 1963), Peal and Lambert (1962), Jensen (1962, I and II), and Macnamara (1966). A large portion of the pre-1960 research examined the effects of bilingualism on intellectual functioning and tended to conclude that bilinguals suffer from a language handicap when measured on verbal tests of intelligence. This body of research was not included as it is generally agreed by scholars in the field that the studies had certain methodological flaws; in particular, investigators made little attempt to control variables such as socio-economic status and degrees of bilingualism. In the words of one author:

> Almost without exception, the monolingual groups in these studies (i.e., the children who gave significantly higher performances on standardized intelligence tests) were speakers of a socio-linguistically dominant language, dominant in the sense that it enjoyed greater prestige and greater communicative utility in the larger society from which the groups were selected. In the majority of these studies, it was further apparent that the bilinguals, regardless of their proficiency in the dominant language, were also disadvantaged by socio-economic environmental factors specific to the lower status bicultural communities in which they were socialized. ... the author feels safe in insisting that the category of research referred to earlier ... has not taken into account all the variables which one must justifiably assume to be operative; and that those studies which followed through to conclude

> that bilingualism as a variable of itself produced intellectual deficit, are beyond the pale of responsible inquiry.
> (Diebold, 1966, pp.19-20)

Doctoral dissertations were not collected and included in this review as they are not easily obtained. Excerpts from all American dissertations that bear on problems and questions about bilingual education completed between 1962 and 1975 (approximately 50) are available in Tucker et al. (1977).

Rotberg (1982) provides the legal background of federal policy in bilingual education in the United States. The paper discusses Title VII of the Elementary and Secondary Education Act of 1965, the 1974 Supreme Court Lau vs Nichols decision, the 1975 Lau Remedies, and the 1978 Title VII Amendments. She writes:

> The purpose of Title VII was to fund bilingual education programs. Its educational philosophy followed a transitional bilingual-bicultural approach, encouraging the use of "bilingual educational practices, techniques, and methods." In order to avoid segregated classes, Title VII permitted the participation of children whose native language is English -- though their percentage could not exceed 40 percent. The Act stated: "The objective of the program shall be to assist children of limited English proficiency to improve their English language skills, and the participation of other children in the program must be for the principal purpose of contributing to the achievement of that objective."
> (Rotberg, 1982, p.33)

Dozens of these Title VII American bilingual programs have been evaluated and the majority have not been included in this document; first, because they have usually been evaluated according to norm-referenced models instead of control-group models and second, because results for non-English speaking children are frequently mixed with those for English-speaking children. Yap (1984) discusses standards for Title VII evaluations.

The issues regarding the optimal age to learn a second language and whether the age of a second-language learner affects the nature of bilingualism are largely unresolved in the research literature and, for this reason, have not been directly addressed in this document. A similar position has been taken by others such as Diaz (1983) and Stern (1982). Some, such as Penfield and Roberts (1959), believe that there is a critical period of years when a second language is acquired with greatest ease; whereas, others such as Snow and Hoefnagel-Höhle (1978) disagree. One reason that the optimal age for introducing a second language is a difficult variable for study and research is that it is not easily separated from the amount of time spent learning a second language. Swain (1981) provides a good overview of the relationship between these two variables. Another paper by Swain (1978) discusses these variables in the context of early, late and partial immersion.

There is a large volume of literature available that examines the linguistic, psychological and neurological bases of bilingualism. This literature includes topics such as interference, transfer, interlanguage, switch mechanisms, translation, language tags, language set, phonology, morphology, lexicon, bilingual/polygot aphasia, compound and coordinate bilingualism, and differential cerebral lateralization. One would expect that this literature and research would be instructive for those involved with bilingual education but on the whole it remains very complex, technical, methodologically weak and inconclusive. Good reviews of these topics may be found in Hatch (1983), Vaid and Genesee (1980) and Albert and Obler (1978). Albert and Obler synthesize the neuropsychological and neurolinguistic evidence and conclude that language is organized in the brain of a bilingual in a manner different from that which might have been predicted by studies of cerebral organization for language in monolinguals. They provide evidence that knowledge of the neurological differences and similarities between monolinguals and bilinguals will be essential to the future of bilingual education. In the final pages of their book they write:

> In summary, it would appear that learning a second language distinguishes the bilingual from the monolingual not only in language skills, but also in perceptual strategies and even in patterns of cerebral organization. If this is true, then certain consequences become apparent. We shall speak of three.

> First, it would no longer be correct to accept the traditional dogma that the left hemisphere is necessarily dominant for language in right-handers. ... The right hemisphere may have as much capacity to acquire language in adult-hood as it does in childhood. It may even be dominant for one of the languages of the bilingual. ...
>
> Second, knowledge that cerebral organization for language differs for bilinguals and monolinguals may be useful therapeutically. ...
>
> Finally, the evidence presented in this book has implications for second language teaching. If it is true that the right hemisphere plays a major role in the acquisition of a second language, at any age, then it might be useful to develop a program of second language teaching that emphasizes so-called "right hemisphere strategies." For example, a second language might be more easily learned if it were taught through nursery rhymes, music, dance, or techniques emphasizing visuospatial skills. (Albert & Obler, 1978, pp.253-4)

CONCLUDING SUMMARY AND DISCUSSION

This document is a review of 110 research studies that investigate the effects of bilingual education and bilingualism on, primarily, the academic and cognitive development of children and young adults. Individually or as a group, these studies cannot be considered to represent all that can be achieved in the field. Many studies have been designed in such a way that they tend to incorporate a rather narrow band of factors and many investigators have proceeded in their research without carefully documenting the characteristics of the bilingual programs, defining bilingualism or randomly assigning children for experimental and control groups. The vast majority of the studies gloss over the impact of such variables as teacher training, teaching style, teacher background characteristics, methods of instruction, types of instructional materials, attitudes within the home, school and community, parent influence and involvement, socioeconomic conditions, official and social status of the languages and social status of each respective ethnic/cultural group. Purposes for establishing bilingual programs and criteria for evaluating their success are too often vaguely stated. The effects of bilingual programs and bilingualism on such variables as self-concept, classroom behavior, school attendance, social development, student employment and teacher employment have been considered by only a few investigators. Researchers rarely design their studies so that bilingual education is the dependent or intervening variable.

A cohesive theory of bilingual education and/or bilingualism has not yet been formulated, meaning that outcomes or consequences of establishing a particular program in a given community cannot be easily predicted. Such a theory cannot be formulated until researchers begin to incorporate a larger array of educational, economic, cultural, social, political, cognitive, linguistic and psychological variables into their investigations.

Keeping in mind these limitations, the purpose of this concluding summary and discussion is to highlight some of the themes that seem to be woven through the research studies reviewed. The ways in which this document is organized (an organization that has not been forced but which has grown naturally from the material) does in part suggest some of these themes but, unfortunately, eclipses others. The 110 research studies represent an amazing diversity and the results and interpretations of results at times seem completely contradictory. More than one reviewer of the literature has admitted to being baffled. Paulston

(1978, p.188), for example, has said that, "A study can be found to support virtually every possible opinion, a not uncommon practice in review-of-the-literature endeavors." The diversity lies with programs, politics, goals, socio-economic conditions, research designs, resources, languages and ethnic/cultural groups. Generalizations, however, are best formulated against a backdrop of differences, variations and extremes and it is in this respect that the diversity of this collection of studies embodies a certain strength.

In the absence of a theory of bilingual education or bilingualism, Vygotsky's ideas and theories seem to help account for the findings of these 110 diverse research studies. Vygotsky proposed that speech is social in origin and at first is used entirely for affective and social functions, after which it develops self-directive properties that eventually result in internalized verbal thought. A few excerpts from Thought and Language (Vygotsky, 1962) serve to further this discussion:

> Thought development is determined by language, i.e., by the linguistic tools of thought and by the sociocultural experience of the child. ... The child's intellectual growth is contingent on his mastering the social means of thought, that is, language. (p.51)
>
> The language of the environment, with its stable, permanent meanings, points the way that the child's generalizations will take. ... Verbal intercourse with adults thus becomes a powerful factor in the development of the child's concepts. (pp.68-9)
>
> ... imitation and instruction play a major role. They bring out the specifically human qualities of the mind and lead the child to new developmental levels. ... Therefore the only good kind of instruction is that which marches ahead of development and leads it... (p.104)
>
> The relation between thought and word is a living process; thought is born through words. A word devoid of thought is a dead thing, and a thought unembodied in words

> remains a shadow. The connection between them, however, is not a preformed and constant one. It emerges in the course of development and itself evolves. (p.153)

If rightly interpreted, these excerpts would seem to suggest that a child's development will be at risk if, for any reason, the chance to develop words and/or thought becomes blocked and that the most devastating kind of block would be one where social and verbal intercourse with adults was severely curtailed. These excerpts would also seem to indicate that going to school and being exposed to an education differs for each child, as each is experiencing a unique social, cultural, lingustic and economic environment outside school.

Several of these studies have involved children who are in environments (social, cultural, linguistic, economic) that seem to block the chance for them to develop words and thought through rich social and verbal intercourse with adults in their lives. Their parents may be barely literate or may need to spend long hours working away from home in order to survive. The language of the home may not be officially recognized, used, or even accepted by the wider community. The language of the home may not be sophisticated; it may not have a written form or it may not be modern. Upon entering school, the children may be suddenly confronted with a new environment and a new language and perhaps with adults who are somewhat less than approving and accepting. Thus, not only do the child's home circumstances limit the full development of thought and words, but the child is at a distinct cultural, social and linguistic disadvantage in the community and at school. In all respects, the chance for a normal development of words and thought is blocked. The best examples in the body of literature reviewed are the American and Mexican Indians, the Aboriginal children in Australia, the Finnish immigrants in Sweden and the Turkish and Moroccan immigrants in Holland. The bilingual experiments set up for these children involve using the heritage languages as media of instruction for all or some of the school curriculum as soon as the children begin school with teachers (sometimes untrained aides) of the same cultural background. So, not only are the children being educated by adults who understand, respect and care for them, but they have a chance to develop words and thought in their first language while learning a second language. Their development of words and thought is thus not put on hold for months or years. While these programs have been shown to be better than regular programs that are conducted only in the second language, few of the investigators report that the children progress at normal rates.

Another set of seemingly contradictory studies has involved children from middle- and upper-class homes where, not only is the home language an official, prestigious one in the community, but the children belong to the majority group and are well accepted and respected. At home, these children are in the best of stimulating environments. They experience sophisticated social and verbal intercourse with well-educated, aware, ambitious adults and are strongly encouraged and guided in all aspects of word and thought development. Upon entering school, they are not faced with an unfamiliar sociocultural milieu. It is within this context that it has been discovered that it is possible to completely immerse children in a second language as soon as they enter school with no detrimental effects on the first language skills and other academic skills but with considerable advantages for learning the second language. In contrast to the minority group children discussed above, these children are not completely blocked in their chance to mature with respect to words and thought -- it is happening at home and in the community. While totally immersed in a second language during the beginning months of school, they may still in fact be developing words and thought in their first language. Monolingual children in such circumstances and such bilingual programs seem to come closer to becoming truly bilingual while maintaining high academic achievement than any other group in any other type of program. The more immersed the children are, the better they learn the second language. The best example is the French immersion programs for English-speaking children in Canada.

A third collection of studies illustrate yet another combination of sociocultural, sociolinguistic and socioeconomic circumstances that have produced bilingual education programs with somewhat different goals, methods and criteria for measuring success. Good examples are the Ukrainian and French children in western Canada, the German children in Cincinnati and the English-speaking Irish children in Ireland. In each of these settings, the ethnic/cultural groups (not first and second generation immigrants) have become quite assimilated in the dominant English language and Anglo culture. English may be used extensively in the home by parents and children and the home environment frequently has the socio-economic goals and advantages of the middle-class. The children feel relatively at ease in the community and are accepted by it. School does not present an unfamiliar milieu. The popular goal of bilingual programs in such settings is to revitalize a language, culture and at times a religion that is being lost through assimilation; reaching a sophisticated level of bilingualism is rarely a high priority. However, those involved are usually concerned that skills in the official language of the dominant culture not deteriorate. The language to be revitalized may be used as a medium of instruction for various subjects and proportions of time, but the more subjects and time, the better the skills that are developed. Interestingly enough, the number of subjects and proportion of time devoted to the two languages have little relationship to skills in the dominant language or achievement in the various academic subjects. The implication would seem to be that the children never experience a block in their chance to develop words and thought. English has been the language of the home, community and school and since they have grown up with the language they have had every opportunity to interact with all the adults in their lives. The revitalization of a heritage language seems not to disturb their intellectual and academic development.

Sometimes bilingual education programs have little impact on language skills (particularly those of speaking and listening) for one or both languages. These programs may exist within a fourth kind of context, the best example of which is the dominant Spanish culture in some communities of California and Texas that border on Mexico. Even though English is the only official language and the dominant language of the United States, Spanish is the dominant culture and language in these areas. The people are not necessarily first and second generation immigrants, but interaction with nearly all the adults in the home and in the community is in Spanish. In regular schools they are confronted with English but are still involved mostly with their Spanish peers. It is not surprising then that a Spanish/English bilingual program in such a setting may do little to improve Spanish speaking and listening skills. However, the program may help prevent the creation of a block; the children are allowed to continue a development of words and thought in school through the Spanish language while being introduced to English. Studies of Spanish children in other areas of the United States that are more Anglo dominant tended to show different results.

The influence and stability of the patterns of language use in communities are also manifested in a few studies that have shown that the introduction of a bilingual education program did little to change how the languages were used in the community. In fact, a bilingual program may not even change the pattern of language use in the school corridors and yard.

Some investigators explain success in second language learning in terms of psychological, motivational terms and have built theories based on instrumental/integrative orientations and/or positive/negative attitudes toward the target language and its speakers. These persons suggest that orientation and attitudes may be more important than language aptitude.

Scattered throughout this review are a few findings (frequently confounded with other findings) that suggest that children may be particularly at risk in their word and thought development if they cannot identify with any cultural group (say in the case of serious home-school conflict) or if they are in bilingual programs that present the two languages concurrently or through simultaneous translation. It may be that children progress most rapidly toward rich bilingualism and well developed words and thought if they identify with both cultural groups. A teacher who switches languages or translates may prevent this dual identification. Two teachers of different cultural groups in one classroom may also impede this dual identification. If the circumstances of the home and community are such that a child has an excellent chance to identify with one culture and to develop words and thought in the language of that culture, the school might do best to emphasize the second language and culture (as is the case with French immersion programs). There is also a suggestion in the literature that simultaneous or concurrent translation programs that supposedly offer a 50-50 balance may inadvertently favor one language or the other.

Another theme that threads its way through the literature and has not been highlighted in any of the section summaries is the notion that outcomes of bilingual programs are frequently of a cumulative nature; that is, the first year or so progress may be particularly slow, while in the following years it speeds up. More than one study presented results that compared experimental groups with control groups by saying, "discrepancies in abilities were decreasing over time", or "the rate of gains for the experimental group increased from year to year." In the case of full immersion programs, initial lags are reported in the language that is neglected for two or three years. These studies reported cumulative effects in a variety of language, academic and cognitive skills. However, again these effects cannot be considered as totally the result of the school program but are intertwined with and a result of many other sociocultural, sociolinguistic and socioeconomic variables.

And finally, a few researchers claim that becoming bilingual raises the level of intellectual functioning. Depending on how one wishes to define intelligence, this may be so. Bilinguals, when compared to monolinguals, may recognize the arbitrary nature of words at an earlier age, may have a keener sense of language sound systems, may display an earlier development of the ability to separate word sound from word meaning, may be more sensitive to feedback cues and may be capable of more flexibility in their thinking thus resulting in better divergent thinking and hypothesizing skills. Vygotsky has written:

> ... a foreign language facilitates mastering the higher forms of the native language. The child learns to see his language as one particular system among many, to view its phenomena under more general categories, and this leads to awareness of his linguistic operations.
> (Vygotsky, 1962, p.110)

However, other measures of intellectual functioning such as verbal and nonverbal standardized IQ tests, word association tests and problem solving tasks produce results that are not at all clear cut. In fact, this whole area is extremely difficult to sort out considering, for example, that standardized intelligence tests frequently require reading and writing skills and may not be correlated with speaking and listening skills.

The diversity of the sociocultural, sociolinguistic and socioeconomic conditions represented by the studies reviewed for this document is mirrored within the school population of the Board of Education for the City of Toronto. The children of the Toronto Board represent many ethnic/cultural groups. (See Larter and Cheng et al., 1982 and Wright and Tsuji, 1984.) Some of the children were born outside Canada, some represent fourth and fifth generation immigrants, some do not speak English at home, some speak two or three languages at home, some have parents with little education who belong to the working class, some have parents who belong to the highest socio-economic groups in the city, some have no peers of the same cultural group, and some can theoretically exist in the city without learning English or French as their cultural groups represent large numbers clustered in certain areas of the city.

Defining bilingual education as has been done in this document as a program using two languages as media of instruction means that with respect to the Toronto Board of Education bilingual programs are in existence for only French and English (Canada's two official languages). In Ontario it is not legal to use non-official languages as media of instruction in the public school system except on a temporary basis to help children acquire English skills. If the time were to come when heritage languages were used as media of instruction in Toronto schools, then this review of research studies suggests that the diversity of the school population of the Toronto Board would require a variety of bilingual programs and teaching methods. In implementing such a variety of programs, conscientious educators would probably want to gather certain kinds of information and keep in mind certain principles as suggested by this review of literature. First, they might wish to gather information on the linguistic, social, cultural and economic circumstances of each ethnic/cultural group. Second, efforts might be made to understand each group's reasons for wanting bilingual/trilingual programs -- some who are well assimilated might want to revitalize their language and culture, others who have just immigrated might wish to maintain their heritage language and/or use it until a satisfactory transition has been made to English or French, while still others might desire a high level of bilingualism/trilingualism for career and economic reasons or for social reasons. Third, special consideration might be given to the resources, particularly teachers and material, that are available and/or might need to be created for each heritage language. Fourth, time might be devoted to becoming aware of the attitudes of various administrators and school staffs and to overcoming undesirable effects that might arise from any negative attitudes. Fifth, each bilingual program might be designed not only according to background characteristics, goals, resources and attitudes but also according to the guiding principle that children need rich social and verbal interaction with adults on a continuous basis to develop words and thought. And, finally, different criteria might be used to evaluate the various programs.

ANNOTATED REFERENCE LIST

Altena, N., & Appel, R. Mother tongue teaching and the acquisition of Dutch by Turkish and Moroccan immigrant workers' children. *Journal of Multilingual and Multicultural Development,* 1982, *3* (4), pp.315-22.

A study of a two-year bilingual transition and maintenance program for Turkish and Moroccan junior age children. Mother-tongues were used as medium of instruction with gradual change to Dutch. Comparison with controls showed that mother-tongue teaching did not hinder the oral and written proficiency of Dutch. (N = 24)

Andrew, C.M., Lapkin, S., & Swain, M. *Report of the 1979 evaluation of a French immersion program and an extended French program in the Toronto Board of Education, grades 5-8.* Toronto: The Ontario Institute for Studies in Education, 1980.

The eighth year of comparing three cohorts (N's = 29, 23, 23) of Toronto Anglo children immersed in French with those in a regular program indicated that pupils in the two programs performed equivalently in English, Math, Science, and work skills. Initial lags in English were mostly overcome. In French measures the pupils compared satisfactorily with immersion students in a more bilingual environment. Other students in a late grade 8 immersion program were doing well but somewhat lower than comparison students of early immersion program.

Anisfeld, E., & Lambert, W.E. Evaluational reactions of bilingual and monolingual children to spoken languages. *Journal of Abnormal and Social Psychology,* 1964, *69* (1), pp.89-97.

Monolingual (N = 79) and bilingual (N = 71) French-Canadian children listened to tape recordings of children's voices, some in English, some in French, and rated each speaker's personality on 15 traits. The French monolinguals upgraded the personalities of French speakers on all traits, whereas the bilingual saw fewer differences between the personalities of the French and English speakers.

Anisfeld, M., & Lambert, W.E. Social and psychological variables in learning Hebrew. *Journal of Abnormal and Social Psychology,* 1961, *63* (3), pp.524-9.

Ability (intelligence and language aptitude) and attitude (reasons for learning and attitude toward culture and community) were correlated with measures of achievement in the Hebrew language for 81 Jewish eighth and ninth grade students in Montreal. The attitude measures were least stable and attempts were made to explain this through sociopsychological characteristics.

Bacon, H.L., Kidd, G.D., & Seaberg, J.J. The effectiveness of bilingual instruction with Cherokee Indian students. *Journal of American Indian Education,* 1982, *21* (2), pp.34-43.

A study of 35 grade eight Cherokee Indian pupils in Oklahoma who had participated in four and five-year bilingual programs. Reading and mathematics test scores compared with those of control pupils showed positive results.

Bain, B. Bilingualism and cognition: Toward a general theory. In S.T. Carey (Ed.), *Bilingualism, biculturalism and education.* University of Alberta, 1974.

This is a report of two studies dealing with contemplative and participative cognition. In the first, 10 bilinguals matched with unilinguals on sex, SES, IQ, grades and developmental level discovered and transferred problem solving rules faster. In the second, 42 bilinguals matched with unilinguals on sex, SES, IQ and grades were more sensitive to emotional expressions as displayed in portraits. An attempt is made to theoretically integrate the views of Piaget and Vygotsky.

Bain, B., & Yu, A. Cognitive consequences of raising children bilingually: 'One parent, one language'. *Canadian Journal of Psychology,* 1980, *34* (4), pp.304-13.

A longitudinal study of three bilingual groups (English/Chinese, French/German, English/French) and six unilingual groups (2 English, 1 Chinese, 1 German, 2 French) in Alsace, Alberta and Hong Kong which showed that by age four children raised bilingually using the 'One parent, one language' principle obtained significantly higher scores on cognitive tests than all unilingual groups. (N = approximately 10 per group.)

Barik, H.C., & Swain, M. Three-year evaluation of a large scale early grade French immersion program: The Ottawa study. Language Learning, 1975, 25 (1), pp.1-30.

The results from three cohorts showed that kindergarten pupils in French immersion programs (FI) are as ready to begin grade 1 as the controls in regular English programs. During grade 1, FI pupils lag behind controls in English reading skills with some abilities to transfer from French to English. During grade 2, with 60 minutes of English a day, the FI pupils catch up to the controls in most English language skills. Math skills and cognitive development at all grades are equal for both groups. FI pupils achieve higher than FSL students in French and compare reasonably well with French-speaking pupils. Pupils were middle to upper socio-economic level. Class was the unit of analysis.

Barik, H.C., & Swain, M. A longitudinal study of bilingual and cognitive development. International Journal of Psychology, 1976, 11 (4), pp.251-63.

This is a longitudinal study of pupils in French immersion and regular programs in Ottawa and Toronto. When adjusted for initial IQ and age differences, regular and immersion students did not differ in overall IQ measures or specific subtest scores between grades 1 and 3. A further analysis showed that high French achievers obtained significantly higher IQ scores than low achievers even after controlling for initial IQ and age. (N = 136)

Barik, H.C., & Swain, M. Evaluation of a French immersion program: The Ottawa study through grade five. Canadian Journal of Behavioral Science, 1978, 10 (3), pp.192-201.

The results of the French immersion program in grades three to five of the Ottawa public school system (Barik and Swain, 1975) indicate that pupils are in general on a par with or ahead of their peers in the regular English program in most academic areas considered (English, Mathematics, work-study skills, science) and are performing satisfactorily in French. Individual was the unit of analysis. Age and IQ were covariates.

Barik, H.C., Swain, M., & Nwanunobi, E.A. English-French bilingual education: The Elgin study through grade five. Canadian Modern Language Review, 1977, 33 (4), pp.459-75.

Four cohorts of Partial French Immersion (PFI) students in grades 2, 3, 4 and 5 were studied again in 1974-1975. The first cohort in grade 5 showed the most favourable results. They scored as well as RE (Regular English) students in mental ability, English language and math skills; their French listening and reading comprehension, and French achievement were also satisfactory in comparison to that of the Total French Immersion (TFI) pupils with similar contact time in French. However, the other cohorts lagged behind their RE peers in math (grades 2, 3, 4) or English (grade 3) or mental ability (grade 2). They also did less well than the TFI students in French. Results of the same four cohorts in the previous years were also summarized. (1974-75 N's = 19, 21, 15, 18.)

Ben-Zeev, S. The influence of bilingualism on cognitive strategy and cognitive development. Child Development, 1977(a), 48, pp.1009-18.

Two groups of primary-aged Hebrew-English bilingual children (one group each in the U.S.A. and Israel) and two groups of monolingual Jewish children (Hebrew and English) with similar intellectual and SES backgrounds were tested. In spite of lower vocabulary level, bilinguals showed more advanced cognitive strategy and development.

Ben-Zeev, S. The effects of bilingualism in children from Spanish-English low economic neighborhoods on cognitive development and cognitive strategy. Working Papers on Bilingualism, 1977(b), 14, pp.83-122.

Ninety-eight bilingual Spanish/English-speaking children were compared with ninety English-speaking Latino children in primary public Chicago schools. Results were similar to Ben-Zeev (1977(a)) in that bilinguals were more attentive to language structure and more ready to reorganize in verbal and nonverbal tasks than the monolinguals in spite of deficiencies in vocabulary and syntax usage.

Bruck, M. The suitability of early French immersion programs for the language-disabled child. Canadian Journal of Education, 1978, 3 (4), pp.51-72.

A study of learning disabled children in French immersion in grades K to 3 matched with control children on sex, age, teacher and father's occupation. The children acquired some proficiency in the French language while developing skills in English. They learned basic concepts of reading, math and spelling taught in French.

Bruck, M., Lambert, W.E., & Tucker, G.R. Bilingual schooling through the elementary grades: the St. Lambert Project at grade seven. Language Learning, 1974, 24 (2), pp.183-204.

This paper presents a review of the St. Lambert Project (Lambert and Tucker, 1972) from Grades K through 7. The samples of grades 6 and 7 experimental students and control students had become much smaller and the instruction time in French had been reduced to under 50%. The grades 6 and 7 experimental students were experiencing no detrimental effects in academic or cognitive development or French communication skills.

Bruck, M., Lambert, W.E., & Tucker, G.R. Assessing functional bilingualism within a bilingual program: The St. Lambert Project at grade eight. Unpublished manuscript, Psychology Department, McGill University, 1975.

A comparison of early immersion pupils' practical skill in French with native-speaking French pupils and late immersion pupils. Usage of French and English language skills was also studied for some groups. Late immersion pupils performed as well or better on all tests, except listening comprehension in French, as early immersion pupils. The grade 7 early immersion pupils used French less frequently and tended to score lower on tests than the grade 8 early immersion pupils. The grade 8 early immersion pupils scored as well as the native-speaking French pupils in all tests. (Small sample)

Bruck, M., Tucker, G.R., & Jakimik, J. Are French immersion programs suitable for working class children? A follow-up investigation. Unpublished manuscript, Psychology Department, McGill University, 1973.

Controlling for SES and IQ, 39 children from working class, English-speaking Quebec homes in a 2- and 3-year French immersion program were found to perform as well as 44 French control and 43 English control children in intellectual development, English, French and mathematics. Progress and results were comparable to middle class immersion programs.

Campbell, R.N., Taylor, D.M., & Tucker, G.R. Teachers' views of immersion-type bilingual programs: A Quebec example. Foreign Language Annals, 1973, 7, pp.106-10.

This is a study of English-speaking and French-speaking teachers' opinions of the St. Lambert French immersion program (Lambert and Tucker, 1972) compared with the regular FSL program. Both English and French teachers agree that the traditional program has limitations. The French-speaking teachers generally view the immersion programs more favorably than the English-speaking teachers. (Total N = 54 teachers)

Capco, C.S., & Tucker, G.R. Word association data and the assessment of bilingual education programs. In J.E. Alatis and K. Twaddell (Eds.), English as a second language in bilingual education. Washington, D.C.: Teachers of English to Speakers of Other Languages, 1976.

A study of the effects of bilingual English and Pilipino instruction (N = 64) with monolingual English (N = 35) or Pilipino (N = 32) instruction on language skill as measured by word association techniques. The results suggested that both language of instruction and language of testing affected language skill. The Ss generally performed better in their native language (Tagalog) than in their second language (English).

Carey, S.T., & Cummins, J. Achievement, behavioral correlates and teachers' perceptions of Francophone and Anglophone immersion students. The Alberta Journal of Educational Research, 1983, 29 (3), pp.159-67.

Francophone students from Edmonton, Ontario and Quebec and Anglophone students from Edmonton and Ontario were compared in their English and French cloze performance. Correlations between English and French cloze performance and other intelligence and cognitive abilities were high. Differences between the mixed group and both the French and English groups are reported in terms of academic cooperation as well as teachers' perceptions of these subgroups. (N's = 26 Francophones, 30 Mixed, and 41 Anglophones)

Carringer, D.C. Creative thinking abilities of Mexican youth: The relationship of bilingualism. Journal of Cross-cultural Psychology, 1974, 5 (4), pp.492-504.

Spanish/English bilinguals (N = 24) scored significantly higher on four subtests of the Torrance Tests of Creative Thinking than Spanish monolinguals in Mexico. The mean age was 15.2 years, and SES levels were middle and upper.

Cathcart, W.G. Effects of a bilingual instructional program on conceptual development in primary school children. The Alberta Journal of Educational Research, 1982, 28 (1), pp.31-43.

Primary children in both an English/French bilingual program and in a regular English program were tested on concept formation and cognitive development. When readiness scores were controlled the bilingual program children were better on one subtest of both the number and the measurement concept test and the use of reversibility as a justification for conservatism. A suggestion of cumulative effects for bilingual programs. Includes discussion of some literature. (N = 96 per program)

Chapman, E. An evaluation of the English-Ukrainian bilingual program: Final report. Winnipeg: Manitoba Department of Education, Feb., 1982.

A 50-50 English/Ukrainian bilingual program in Manitoba when evaluated showed that after 2 1/2 years, students were performing at about 75% on Ukrainian oral skills, and were developing reading and writing skills. After an initial lag, the bilingual students' English skills were at a level comparable to that of regular program students. (Varied N's = 86 to 131 bilingual students)

Chesterfield, R. et al. An evaluation of the Head Start bilingual bicultural curriculum models. Final report. Executive summary. Los Angeles, California: Juarez and Associates, Inc., 1982.

A total of 243 English- and Spanish-speaking pre-school children in bilingual Head Start programs were compared with 199 similar children in nonbilingual programs in several Spanish dominant communities. The Spanish experimental group made significantly better pre-post gains over the Spanish comparison group on most of the English language measures and performed equally well or better on the Spanish language measures. The English-speaking group performed as well as the comparison group on all English language measures and Spanish language tests.

Cohen, A.D. The Culver City Spanish immersion program: the first two years. Modern Language Journal, 1974, 58, pp.95-103.

This paper summarizes three University of California M.A. theses done on this project. The English-speaking students in the Spanish immersion program were reported as acquiring competence in understanding, speaking, reading, and writing Spanish, while maintaining English-language proficiency. The students were also performing well in subjects such as mathematics. Two classes of kindergarten and grade one children along with control children were involved. (IQ and SES are not discussed)

Cohen, A.D. A sociolinguistic approach to bilingual education: Experiments in the American southwest. Rowley, Mass.: Newbury House, 1975.

A longitudinal study of bilingual (Spanish/English) primary children in Redwood, California (N = 45). Bilingually schooled children were as proficient in English language skills, slightly more proficient in Spanish skills and the same or better in mathematics than the comparison students; they also used Spanish more. Includes history and literature review of bilingualism and bilingual programs. (See Cohen et al., 1976.)

Cohen, A.D., Fathman, A.K., & Merino, B. The Redwood City Bilingual Education Project, 1971-1974: Spanish and English proficiency, mathematics, and language use over time. Working Papers on Bilingualism, 1976, 8, pp.1-29.

This paper reports a sequel to Cohen's original study for Mexican-American primary bilingual children (see Cohen, 1975) in a program which used English and Spanish simultaneously. Attrition had reduced the sample size to 18, making the findings only suggestive. Several results were similar to those of the original Cohen study and thus were favorable to the bilingual program, but other results were mixed or favoured the comparison English-only instruction.

Cohen, S.P., Tucker, G.R., & Lambert, W.E. The comparative skills of monolinguals and bilinguals in perceiving phoneme sequences. Language and Speech, 1967, 10, pp.159-68.

Five groups of university students, one monolingual in English (N = 20), one monolingual in French (N = 26), one bilingual and native in English (N = 12), one bilingual and native in French (N = 21), and one bilingual and native in both (N = 15) were measured for their accuracy in perceiving initial phoneme sequences. The bilinguals who were native in English or both languages were superior on the tasks. Errors tended to be distortions in the direction of the subjects' native language.

Collison, G.O. Concept formation in a second language: A study of Ghanaian school children. Harvard Educational Review, 1974, 44 (3), pp.441-57.

Eighty-five sixth grade Ga- and Twi-speaking students who had studied English for about six years manipulated and then discussed specially chosen science materials. A study of the untutored statements of the students showed that children function at a higher conceptual level in their vernacular than in English.

Cowan, J.R., & Sarmed, Z. Reading performance of bilingual children according to type of school and home language. Working Papers on Bilingualism, 1976, 11, pp.74-114.

This study examined bilingual children's performance in reading Persian and English at grades one, three and six. Two types of programs, one an immersion and one a 50-50 split were compared with monolingual control schools. The results showed the bilingual children performing not quite as well as either of their monolingual peers, although the difference was more striking for Persian than English. Entire classes averaging about 25 students were examined.

Crawford, P. *Evaluation of the French immersion program, Spring, 1983.* Willowdale: North York Board of Education, 1984.

Tests of English reading and writing; French reading, language skills, listening and writing; mathematics; and self-concept showed results for the immersion students which were consistent with those of programs in other Canadian centres. Tests given varied for the grades 2, 4, 6, 8 and 9 students.

Cummins, J. Cognitive factors associated with the attainment of intermediate levels of bilingual skills. *The Modern Language Journal,* 1977, 61, pp.3-12.

An investigation of cognitive processes and the attainment of balanced bilingual skills for Edmonton children from English, French and mixed French/English home backgrounds. The findings can be interpreted to mean that higher levels of divergent thinking are either a causal element or an effect of the attainment of functional bilingualism. Also, bilingual learning experiences may be either positive or negative depending on the level of competence the child attains in the two languages. (Total N = 82)

Cummins, J. Bilingualism and the development of metalinguistic awareness. *Journal of Cross-Cultural Psychology,* 1978(a), *9* (2), pp.131-49.

Tasks were designed to assess metalinguistic awareness and ability to evaluate contradictory and tautological statements of grades 3 and 6 English/Irish bilingual children and control groups of unilingual children matched on IQ, SES, sex and age. The bilingual children showed a greater awareness of certain properties of language and were better able to evaluate contradictory statements. (N = 53 bilingual children)

Cummins, J. Immersion programs: The Irish experience. *International Review of Education,* 1978(b), *24* (3), pp.273-82.

A paper which presents the attitudes of 63 infant and primary teachers in 15 Irish immersion schools in English-speaking areas. Most felt that becoming bilingual confers intellectual advantages on children, particularly those who are bright, outgoing, motivated and have parental support. A history of Irish immersion education is included.

Cummins. J., & Gulutsan, M. Bilingual education and cognition. The Alberta Journal of Educational Research, 1974, 20 (3), pp.259-69.

Sixty-one grade 6 balanced bilinguals in a French/English bilingual program in Edmonton performed better than unilinguals, matched for sex, SES and age, on several measures of reasoning and divergent thinking. Other findings suggested that bilingual schooling has different effects on children from different home backgrounds.

Cummins, J., & Mulcahy, R. Orientation to language in Ukrainian-English, bilingual children. Child Development, 1978, 49 (4), pp.1239-42.

Two groups of primary children attending a bilingual program in Edmonton, Canada were compared with a unilingual control group matched for IQ, SES, sex and age. The most fluent bilingual children were better able to analyze ambiguity in sentence structure than were the less bilingual and unilingual children. No differences were found for awareness of the arbitrary nature of word-referent relationships. (N = 24 per group)

Cziko, G.A. The effects of language sequencing on the development of bilingual reading skills. Canadian Modern Language Review, 1976, 32 (5), pp.534-39.

Sixty-one English-speaking Quebec children participated in three K-4 programs to foster bilingual reading skills. None of the three programs -- early immersion, late immersion or FSL -- had detrimental effects on the English reading skills after controlling for SES and non-verbal intelligence. Also on a test of French reading, both immersion groups did as well as a French control group.

Davine, M., Tucker, G.R., & Lambert, W.E. The perception of phoneme sequences by monolingual and bilingual elementary school children. Canadian Journal of Behavioral Science, 1971, 3 (1), pp.72-6.

Classes of grades 3 and 4 Montreal students, some schooled monolingually in either French or English (N = 77) and some schooled bilingually in both English and French (N = 44) were compared for their ability to differentially discriminate initial phoneme sequences. The bilingually taught children had developed a sensitivity for the sound system of their second language, but this training had not resulted as of grade 4, in a generalized facility in discriminating sound systems.

Edmonton Public Schools. Evaluation of the bilingual (English-Ukrainian) program, 1978-1979. Department of Planning and Research, Edmonton Public Schools, 1979.

This is a yearly evaluation report of a partial immersion bilingual program introduced in 1974. Bilingual students in grades 2 to 5 achieved as well or better than students in the regular programs in both reading and mathematics. Pre- and post-test results and questionnaires returned by parents, teachers and principals also indicated that the bilingual students were acquiring a degree of proficiency in the Ukrainian language and an appreciation of the Ukrainian culture. (N = 241 experimental children)

Edwards, H.P., & Casserly, M.C. Research and evaluation of second language (French) programs in the schools of the Ottawa Roman Catholic Separate School Board. (Annual Reports 1971-1972 and 1972-1973.) Toronto: Ministry of Education, Ontario, 1976.

Two annual reports of a longitudinal assessment of the relative progress of primary school children enrolled in programs designed to promote bilingualism. Findings supported the value of French immersion when compared with 75-minute and 20-minute a day programs. Children were mostly of English and French backgrounds. Large N's. A supplement discusses results for Italian children.

Ehindero, O.J. The influence of two languages of instruction on students' levels of cognitive development and achievement in science. Journal of Research in Science Teaching, 1980, 17 (4), pp.283-8.

Two groups (N = 60 each) of Yoruba-speaking junior-aged Nigerian students of equivalent educational and SES background were taught science in Yoruba and in English. Using Piagetian tasks and test items classified according to Bloom's taxonomy, it was determined that children taught in Yoruba did better on science concepts which required the use of higher-level cognitive skills.

Ewanyshyn, E. Evaluation of a Ukrainian-English Bilingual Program, 1978-1979. Edmonton Catholic School System, 1980.

Students in the bilingual program achieved as well in English language arts and mathematics as students in the regular program at grades 2 to 5 and made very significant progress in learning Ukrainian, appreciating Ukrainian culture and understanding the Ukrainian Catholic Rite. The attitudes of parents, students, teachers and principals were very positive. 193 students were matched with 193 controls on sex, age, grade, SES and primary mental ability.

Feldman, C., & Shen, M. Some language-related cognitive advantages of bilingual five-year-olds. *The Journal of of Genetic Psychology,* 1971, 118, pp.235-44.

Mexican and Black (N = 15) monolingual and Mexican bilingual (N = 15) Head Start children were compared at tasks involving object constancy, naming and the use of names in sentences. All tasks, especially nonverbal ones, were easiest for bilinguals.

Gaardner, A.B., & Richardson, M.W. Two patterns of bilingual education in Dade County, Florida. In T.E. Bird (Ed.), *Foreign language learning: Research and development: An assessment.* Northeast Conference on the Teaching of Foreign Languages, Inc., Reports of the Working Committee, 1968.

A Florida two-way bilingual program in which Spanish- and English-speaking children in grades 1-3 received instruction in their native tongue during one-half of each day was evaluated during the first three years of operation. Both English- and Spanish-speaking pupils in the program performed as well in language arts and arithmetic as did their corresponding groups who had studied their regular curriculum in the monolingual control school. Experimental pupils also made significant gains in their ability to read, understand and deal with academic content in their native and second language.

Gale, K., McClay, D., Christie, M., & Harris, S. Academic achievement in the Milingimbi bilingual education program. *TESOL Quarterly,* 1981, *15* (3), pp. 297-314.

An Australian bilingual program in English and Gupapuyngu was started in 1973. For four years, children from both English-only and bilingual classes were tested for achievement in oral English, English reading, creative writing and mathematics. At the end of the program, the children from bilingual classes were performing better in seven out of ten tests than the English-only children. (N's = 10 to 30)

Gardner, R.C., & Lambert, W.E. *Attitudes and motivation in second-language learning*. Rowley: Newbury House, 1972.

A correlational study of 54 variables including attitudes, motivation, language learning aptitudes, personality, social and language background, language achievement and IQ of high school students in three American cities (N's = 176, 243 and 142) and one Philippine city (N = 103) involved in learning a second language to determine why some students learn a foreign language better than others. Two independent clusters of variables were identified as important; they were IQ/language aptitude and attitude/motivation (integrative vs instrumental).

Genesee, F. The role of intelligence in second language learning. Language Learning, 1976, 26 (2), pp.267-80.

Anglophone Quebec students from grades 4, 7 and 11 in each of regular French-as-a-second-language courses and French immersion courses were evaluated on a battery of French language tests. Reading and language usage tests correlated with IQ while listening comprehension and interpersonal communication skills did not. The immersion groups scored consistently higher than the FSL groups.

Genesee, F. Second language learning and language attitudes. Working Papers on Bilingualism, 1978(a), 16, pp.19-41.

Students from grades 6 and 11 of immersion and regular Montreal French programs were administered an attitude questionnaire. In spite of extra work and no increased use of French in the community, immersion students were happy with the program, recommended it for others and felt comfortable and confident with French. (N's = 65 and 86 immersion students)

Genesee, F. A longitudinal evaluation of an early immersion school program. Canadian Journal of Education, 1978(b), 3 (4), pp.31-50.

A summary of the findings of a longitudinal (grades 1 to 6) evaluation of an early French immersion program in a Montreal Protestant school board. At the end of grade 3, despite an initial lag, immersion students equalled the controls in English language skills. They also had satisfactory, although not native-like, French skills and were not retarded in their mathematics taught in French. The pattern of results was largely sustained throughout grades 4, 5 and 6. Results were similar for all IQ levels and both sexes. (N's = 46 to 63 middle class children)

Genesee, F., Polich, E., & Stanley, M. An experimental French immersion program at the secondary school level: 1969 to 1974. Canadian Modern Language Review, 1977, 33, pp.318-32.

A comparison with English and French controls of 108 Montreal Anglo children in a grades 7 to 11 late immersion French program. There were no detrimental effects for English literacy skills. For French interpersonal communication skills, the immersion students performed better than English controls, but not as well as French controls. No negative effects were found in mathematics and attitudes. Interpersonal communication skills were not related to IQ levels.

Genesee, F., & Stanley, M.H. The development of English writing skills in French immersion school programs. Canadian Journal of Education, 1976, 1 (3), pp.1-17.

No harmful effects resulted to English writing skills of students in both early and late French immersion programs in Montreal. IQ and SES were controlled. (N's = 54 grade 4, 26 grade 6, 117 grade 7 and 86 grade 11 students)

Genesee, F., Tucker, G.R., & Lambert, W.E. Communication skills of bilingual children. Child Development, 1975, 46, pp.1010-14.

Native Montreal English-speaking children in two French immersion programs were tested in English on social skills and compared with a matched group in an English program comparable in terms of age, SES and IQ. The immersion groups showed more differential sensitivity in interpersonal communication. (N's = 11 per group)

Genesee, F., Tucker, G.R., & Lambert, W.E. An experiment in trilingual education: Report 3. In S.T. Carey (Ed.) The Canadian Modern Language Review, 1978, 34, pp.621-43.

This is a third-year report comparing double-immersion programs (Hebrew/French) in two English-speaking Hebrew-day Montreal schools with an enriched Hebrew program with regular FSL. Grades 2 and 4 children (N's = 48, 38) were tested after both had been in the experimental programs for three years. Linguistic and language academic achievement were assessed in three languages and mathematics was assessed in English and French. Nonverbal IQ was controlled. In general, the results indicated no cause for concern for the double immersion students.

Gulutsan, M. Third language learning. Canadian Modern Language Review, 1976, 32 (3), pp.309-15.

A discussion of language programs and research directions in Alberta. Results by sex, grade, SES and length of residency from a secondary analysis of data collected from a bilingual French/English junior and senior high schools in Edmonton are presented.

Hébert, R., et al. *Rendement académique et langue d'enseignement chez les élèves franco-manitobains.* Saint-Boniface, Manitoba: Centre de recherches du Collège Universitaire de Saint-Boniface, 1976.

A study which disproved parents' fears that: (1) their children's academic performance would be lower if they took courses in French rather than English, and (2) a high proportion of instruction in French would adversely affect command of English. N = 2144 pupils in grades 3, 6 and 9 and controls. Control variables were IQ, SES and motivation; and dependent variables were academic achievement in English, French, mathematics and social studies.

Ianco-Worrall, A.D. Bilingualism and cognitive development. *Child Development,* 1972, 43, pp.1390-1400.

A study using Vygotsky's techniques which supported Leopold's observations on the earlier separation of word sound from word meaning. The subjects were 30 Afrikaans/English bilingual primary-aged children in South Africa. Controls were unilingual in English and Afrikaans.

Jacobs, J.F., & Pierce, M.L. Bilingualism and creativity. *Elementary English,* 1966, 43, pp.499-503.

A Florida study of 71 sixth- and fifth- grade children -- 20 monolingual American, 16 Greek-American, 17 Spanish-American and 18 Czech-American. The bilinguals scored higher on the non-verbal "uses" test of creativity, and lower on the verbal "word meanings" test even when matched for IQ.

Kaufman, M. Will instruction in reading Spanish affect ability in reading English? *Journal of Reading,* 1968, *11* (7), pp.521-7.

A New York experiment involving 139 grade seven Spanish-speaking pupils randomly assigned to a program teaching reading skills in Spanish two to three hours a week and a control program offering no instruction in Spanish. Using control measures in IQ, age and initial reading scores, the findings suggested some positive transfer of learning from instruction in reading Spanish to reading ability in English and no evidence of interference.

Kittell, J.E. Intelligence-test performance of children from bilingual environments. *Elementary School Journal,* 1963, 64, pp.76-83.

Thirty-three bilingual children from 15 languages were compared with 33 unilingual children in California on IQ and reading tests administered in grades 3 and 5. The findings suggest that bilingual primary children may suffer a handicap that affects their performance on verbal intelligence tests and reading tests. A bilingual environment may, however, be a factor in verbal improvement during the intermediate grades.

Lambert, W.E., Gardner, R.C., Barik, H.C., & Tunstall, K. Attitudinal and cognitive aspects of intensive study of a second language. *Journal of Abnormal and Social Psychology,* 1963, *66* (4), pp.358-68.

American University students at two levels of skills in French attending a six-week French summer school in Montreal were studied. Results supported the theory that learning a second language depends on an appropriate pattern of attitudes toward the other cultural group and a particular orientation toward language study. Anomie increased for both groups of students during the course. (N = 192)

Lambert, W.E., & Tucker, G.R. *Bilingual education of children: The St. Lambert experiment.* Rowley: Newbury House, 1972.

A longitudinal investigation of academic, linguistic, cognitive and attitudinal variables of English-Canadian children in a Montreal primary French immersion program. French and English children in regular programs matched on IQ, SES and parents' attitudes were used as controls. The immersion groups performed as well in English, French, mathematics, creativity and cognitive functioning as the controls. They also had good attitudes toward French people and the program and had good self-concepts. Various attitudes of teachers and parents were positive.

Landry, R.G. A comparison of second language learners and monolinguals on divergent thinking tasks at the elementary school level. *Modern Language Journal,* 1974, 58, pp.10-15.

A comparison of elementary children in a FLES program (N = 72) with control children on *Torrance Tests of Creative Thinking* in New Hampshire. The FLES group (learning Spanish) scored highest on all six dependent variables at grade 6, while at grade 4 similar trends favoring the FLES group were obvious. Schools and students were randomly selected, and SES and sex were controlled.

Lapkin, S. The English writing skills of French immersion pupils at grade five. Canadian Modern Language Review, 1982, 39 (1), pp.24-33.

Global ratings of grade five immersion and regular students' (Total N = 98) English compositions did not differ.

Lapkin, S., Andrew, C.M., Harley, B., Swain, M., & Kamin, J. The immersion centre and dual-track school: A study of the relationship between school environment and achievement in a French immersion program. Canadian Journal of Education, 1981, 6 (3), pp.68-90.

Tests of French, English, mathematics, work study skills and science were given to 111 immersion centre students, 164 dual-track immersion students and 142 regular English program students at the grade 5 level from the Carleton Board of Education. Immersion centre students were superior on some French and English skills. It appeared that school environment was more closely associated with success than home background, parental motivation, or outside school exposure to French.

Legarreta, D. The effects of program models on language acquisition by Spanish speaking children. TESOL Quarterly, 1979, 13 (4), pp.521-34.

Controlling for cognitive ability and Spanish dominance, this study showed that bilingual program models with balanced language input are most facilitative for both Spanish and English acquisition by children. Small samples (N's = 6 to 13) of native-speaking kindergarten children participated in five program models, two with ESL.

Lerea, L., & Kohut, S. A comparative study of monolinguals and bilinguals in a verbal task performance. Journal of Clinical Psychology, 1961, 17, pp.49-52.

Two experimental groups, 30 bilinguals and 30 monolinguals, matched in age intelligence, sex and SES, were administered a bilingualism questionnaire, a mental maturity scale, an association test, a personality scale and a relearning association test. The bilinguals learned and relearned the association test more rapidly than the monolinguals. Study done at Northern Illinois University.

Lerea, L., & LaPorta, R. Vocabulary and pronunciation acquisition among bilinguals and monolinguals. Language and Speech, 1971, 14, pp.293-300.

Monolinguals and co-ordinate and compound bilinguals (N = 51) attending university were required to learn two lists of nine disyllabic Hebrew words visually and auditorially. The average scores of both bilingual groups were better than the monolinguals in aural vocabulary; however, when the words were seen, the monolinguals were superior to the compound bilinguals.

Lewis, H.P., & Lewis, E.R. Written language performance of sixth-grade children of low socio-economic status from bilingual and monolingual backgrounds. The Journal of Experimental Education, 1965, 33 (3), pp.237-42.

A study of 98 monolingual, 56 Chinese-bilingual and 42 Spanish-bilingual children in California matched by IQ and of similar scholastic and SES background. Analysis of compositions written after viewing a film without words showed that bilingualism in general did not have an adverse effect upon written language.

Liedtke, W.W., & Nelson, L.D. Concept formation and bilingualism. Alberta Journal of Educational Research, 1968, 14 (4), pp.225-32.

Two samples (N = 50 each) of Edmonton grade one pupils, one monolingual and the other bilingual, were tested on a specially constructed Concepts of Linear Measurement Test based on Piaget's test items. The bilingual sample was better than the monolingual on the test. The bilinguals received instruction in English and French and were brought up in a bilingual home environment.

Löfgren, H., & Ouvinen-Birgerstam, P. A bilingual model for the teaching of immigrant children. Journal of Multilingual and Multicultural Development, 1982, 3 (4), pp.323-31.

This is an evaluation of a bilingual program for Finnish children. The data were Swedish and Finnish language tests, ability tests, interviews with parents and observations by teachers. The school achievement of the Finnish children, especially their language ability was compared with the achievement level of other relevant groups of pupils. The model was found to work well and to enhance the prospects of Finnish pupils.

McConnell, B.B. *How are bilingual outcomes influenced by community pressures toward language shift?* Paper presented at the American Educational Research Association annual meeting, Montreal, 1983.

Spanish-American children of migrant farm workers from two parallel bilingual programs in opposite sociolinguistic environments in Texas (N=45) and Washington (N=75) were measured on English and Spanish vocabulary, math and English reading. In both sites, measures on all variables increased according to length of program attendance. For English and Spanish vocabulary, progress was directly related to the different sociolinguistic characteristics of the two sites.

Macnamara, J. *Bilingualism and primary education: A study of Irish experience.* Edinburgh: University Press, 1966.

Six groups of Irish primary pupils who differed in the amount of Irish taught were tested in mechanical and problem arithmetic and various subtests of English and Irish language. SES, nonverbal IQ and teaching skill were controlled. Results support the balance effect in language learning. Teaching arithmetic in Irish to English speakers retarded problem, but not mechanical, arithmetic and had no effect on English. More bilingual Irish speakers were best in Irish and worse in English and all arithmetic. None of the Irish samples matched the British sample in English. (N = 1084)

Macnamara, J., Svarc, J., & Horner, S. Attending a primary school of the other language in Montreal. In A. Simoes Jr. (Ed.) *The bilingual child.* New York: Academic Press, 1976.

Five English and four French primary schools (grades 4 to 6) with children from the other linguistic group were tested in language, interviewed and administered questionnaires and sociograms. These data along with teacher-interview data showed that in some respects an English child's going to French school is not the same as a French child's going to English school.

Modiano, N. National or mother language in beginning reading: A comparative study. *Research in the Teaching of English,* 1968, 2, pp.32-43.

Children from Mexico whose native languages were Tzeltal and Tzotzil in 13 schools were taught to read in their native languages first and were compared with children who were taught to read in Spanish. The former group learned to read with greater comprehension in Spanish than the latter. The study also suggested that teachers' abilities to communicate and their attitudes outweigh training and educational level.

Moody, J.L. Evaluation of the Punjabi-English class at the Moberly Primary Annex for the 1973-74 school year. Vancouver: Board of School Trustees, Department of Planning and Evaluation, 1974, #74-18.

A small sample of Punjabi children (ages 5 to 9) were placed in a transition program where the teacher spoke Punjabi when necessary and the children had Caucasian buddies. When compared with similar children in regular programs (age, sex, length of residence and IQ controlled) they scored higher in the areas of verbal fluency and self-concept and the same in classroom behavior, absenteeism, vocabulary, IQ, constants and oral language. Both groups were poor in auditory discrimination and English articulation.

Moore, F.B., & Parr, G.D. Models of bilingual education: Comparisons of effectiveness. Elementary School Journal, 1978, 79 (2), pp.93-7.

A study involving several dependent and independent variables of 207 Title VII children of seasonal workers in rural Texas in grades K-2 in four schools. One finding indicated that non-bilingual classes scored significantly higher than bilingual ones in English reading and language. Study has several limitations.

Muller, L.J., Penner, W.J., Blowers, T.A., Jones, J.P., & Mosychuk, H. Evaluation of a bilingual (English-Ukrainian) program. Canadian Modern Language Review, 1977, 33, pp.476-85.

Five Edmonton public schools offered a grade one program with 50% instruction in Ukrainian and 50% in English. Seventy experimental pupils, their teachers, administrators, parents and control pupils were involved with tests and interviews in English and Ukrainian. Participation in the bilingual programs did not adversely affect achievement in regular curriculum areas. Positive attitudes were reported as well as well-developed Ukrainian oral language skills.

Ojerinde, A. Testing for the effects of language on science achievement of primary four pupils in Nigeria. Adolescence, 1982, 17 (66), pp.335-45.

An investigation of the effect of the medium of instruction and medium of examination on the achievement of children (1) instructed in Yoruba, examined in Yoruba; (2) instructed in Yoruba, examined in English; (3) instructed in English, examined in English; (4) instructed in English, examined in Yoruba. Children in group one performed best. Urban and rural children taught in English performed best if examined in Yoruba. (Total N = 597)

Oliver, E., Corlett, C., & McKenzie, C. *Wellington County French immersion program - kindergarten and grade 1, 1975-1976.* Guelph: Wellington County Board of Education, 1976.

Kindergarten immersion students were as ready to enter an English grade 1 class as control children. At grade 1, immersion students lagged in English but performed as well in mathematics. IQ was controlled. (N's = 60 and 58)

Oren, D.L. Cognitive advantages of bilingual children related to labelling ability. *Journal of Educational Research,* 1981, *74* (3), pp.163-9.

This study that examined the effects of bilingualism (coordinate and compound) and monolingualism on children's cognitive flexibility found that the average performance of coordinate bilingual subjects in labelling and naming tasks was significantly better than the performance of compound bilingual and monolingual subjects. It was also found that coordinate subjects were more advanced in differentiating objects and their corresponding symbols. (Total N = 32)

Owens, T.R. *Analysis of a Spanish bilingual preschool program.* Paper presented at AERA, Chicago, Illinois, April, 1972.

This California project provided instruction in Spanish and English for 100 children (ages 3 to 6) over a one and one-half year period. Parents were actively involved. Three- and four-year-old bilingual students had better growth in oral Spanish and oral English than the control groups. Pre-school and kindergarten bilingual children did better on the correct use of past tense in Spanish.

Peal, E., & Lambert, W.E. The relation of bilingualism to intelligence. *Psychological Monographs: General and Applied,* 1962, *76* (27), pp.1-23.

A group of monolingual and a group of bilingual 10-year-old children from six Montreal French schools were administered verbal and nonverbal intelligence tests, and measures of attitudes to the English and French communities. The bilinguals performed best on all tests, and several explanations are suggested. A literature review is included.

Plante, A.J. The Connecticut 'pairing' model proves effective in bilingual/bicultural education. *Phi Delta Kappan,* 1977, *58* (5), p.427.

Students who were dominant in Spanish benefitted greatly from a program that taught all the basic skills in Spanish combined with English language arts instruction. Spanish and English academic skills, self-esteem and behavior were measured. (N = 45 Spanish dominant children in the experimental group and 27 in the control group.)

Popp, L.A. The English competence of French-speaking students in a bilingual setting. *The Canadian Modern Language Review*, 1976, 32, pp.365-77.

A Canadian study of the K-13 Niagara South bilingual program. Students begin education in French with English introduced in grade 3 and increasingly used to grade 13. English and reading tests and an employment survey of grade 12 students and controls showed mixed results. (N's = 15 to 28)

Pryor, G.C. *Evaluation of the bilingual project of Harlandale Independent School District, San Antonio, Texas, in the first grades of four elementary schools during 1966-67 school year.* San Antonio, Texas: Harlandale Independent School District, 1967.

A comparison of achievement and personal adjustment of Spanish-speaking students in an experimental bilingual school environment at the first grade with traditional English-only instruction in four schools. The results of the evaluation tend to reflect favourably on bilingual instruction.

Purbhoo, M., & Shapson, S. *Transition from Italian.* Toronto: The Board of Education for the City of Toronto, Research Department, 1975, #133.

A two-year transition program in kindergarten is compared to regular classes with children of similar ethnic and SES backgrounds. Tests, observations and teacher ratings of language, behavior, self-concept and social interaction showed no negative results for the transition students, and their parents were more involved. Some additional data suggest bilingual students have better cognitive development. (Final N = 32 transition students)

Quinn, M.E., & Kessler, C. *Science education and bilingualism.* Paper presented at the Annual Convention of the National Association for Research in Science Teaching, Boston, Massachusetts, April, 1980.

The effect of bilingualism on the ability to formulate scientific hypotheses or solutions to science problems is examined for sixth-grade students ranging from monolingual high SES level English-speaking children to proficient bilingual Spanish-English low SES children. The significant difference was found between the experimental and control groups for both monolinguals and bilinguals when comparing the scope for quality of scientific hypotheses, with the bilinguals scoring higher.

Rogers, R.S., & Wright, E.N. *The school achievement of kindergarten pupils for whom English is a second language: A longitudinal study using data from the study of achievement.* Toronto: The Board of Education for the City of Toronto, Research Department, 1969, #80.

A longitudinal study of 8695 senior kindergarten Toronto pupils from 1961 to 1968 in which monolingual and bilingual pupils were compared. Bilinguals were found to have a performance deficit which was overcome by grade 3.

Rosier, P., & Farella, M. Bilingual education at Rock Point -- some early results. *TESOL Quarterly,* 1976, *10* (4), pp.379-88.

An American study of 4th and 5th grade Navajo students who learned to read in Navajo and continued to have content instruction in Navajo while they later learned English. English reading test results were positive and cumulative when compared with national norms, students in earlier ESL programs and students in Bureau of Indian Affairs schools. (N = 40 grade fours)

Saegert, J., Scott, S., Perkins, J., & Tucker, G.R. A note on the relationship between English proficiency, years of language study and medium of instruction. *Language Learning,* 1974, 24, pp.99-104.

The purpose of this investigation was to examine the relationship between measured English-language proficiency, years of English-language study and the use of English or French as a medium of instruction for samples of Arabic-speaking Egyptians (N = 114) and Lebanese (N = 71) university students. No systematic relationship was found between years of EFL study and English proficiency; however, the use of a foreign language (English and French) as a medium of instruction is a better overall predictor of proficiency.

Samuels, M., Reynolds, A.G., & Lambert, W.E. Communicational efficiency of children schooled in a foreign language. *Journal of Educational Psychology*, 1969, *69* (5), pp.389-93.

Quebec English-speaking children who had received their first two years of instruction exclusively in French were found to be as capable as matched (SES and IQ) control groups of monolingual English- and French- speaking children, in encoding and decoding novel information. (N's = 22, 28 and 23)

Shapson, S.M., & Day, E.M. A longitudinal evaluation of an early immersion program in British Columbia. *Journal of Multilingual and Multicultural Development*, 1982, *3* (1), pp.1-16.

Two cohorts of French-immersion students performed similarly in mathematics and English to regular students. Immersion students had higher levels of French achievement than students enrolled in other types of French programs. Initial lags in English were found in grades 1 and 2. Positive attitudes toward French language and culture were associated with immersion students. (N's = 19 to 46)

Shapson, S., & Kaufman, D. A study of a late immersion French program in secondary school. *Canadian Modern Language Review*, 1978, *34* (2), pp.186-93.

A study of growth in French language skills and change in attitudes of 24 grade 10 French immersion students in B.C. French skills were better than regular grade 10 controls, and similar to regular grade 12 controls. The immersion students had more positive integrative attitudes.

Skutnabb-Kangas, T. *Language in the process of cultural assimilation and structural incorporation of linguistic minorities.* Rosslyn, Va.: National Clearinghouse for Bilingual Education, 1979.

Three groups of Finnish children in two communities in Sweden were studied. Finnish children from Olofström who were instructed entirely in Swedish (N = 351) had the lowest scores in Finnish picture vocabulary test as compared to similar children from Gothenburg who were instructed in Finnish either as subject (N = 202) or medium (N = 134). The Olofström Finnish immigrants were also performing below average in the Swedish language skills and school achievement. Data also indicated that Finnish children who started school in Finnish scored higher in Swedish listening comprehension than their counterparts who started school in Swedish.

Skutnabb-Kangas, T., & Toukomaa, P. *Teaching migrant children's mother tongue and learning the language of the host country in the context of the socio-cultural situation of the migrant family.* Helsinki: The Finnish National Commission for UNESCO, 1976.

A study of the importance of mother tongue teaching and the significance of age of immigration for Finnish children in Sweden. The extent to which mother tongue had been developed prior to contact with Swedish (naturally in Finland or through mother tongue teaching in Sweden) was strongly related to how well Swedish was learned. (N = 687) Some theory development.

Spence, A.G., Mishra, S.P., & Ghozeil, S. Home language and performance on standardized tests. The Elementary School Journal, 1971, 71, pp.309-13.

An inquiry into the relationships between home language patterns of 146 first-grade Mexican-American pupils and their performance on a battery of standardized tests in Arizona. Children instructed in Spanish and English at home had intellectual advantages over those instructed in Spanish only, but both groups are disadvantaged in their readiness for academic achievement.

Spilka, I.V. Assessment of second-language performance in immersion programs. The Canadian Modern Language Review, 1978, 32 (5), pp.543-61.

Spontaneous speech samples were obtained from 20 fifth and sixth graders (see Lambert and Tucker, 1972) in immersion programs and compared with those of native speakers of French. The speech of non-native speakers was characterized by a slower rate of production and simpler sentences. However, the non-natives could adequately express themselves in French, and their language style was as flexible as that of French speakers. Numerous errors in sentence completeness, gender, and verbs were made by non-natives but with fewer errors on prepositions and pronouns. Non-natives made more errors of all types than natives.

Stafford, K.R. Problem solving as a function of language. Language and Speech, 1968, 11, pp.104-12.

English-speaking monolingual, and bilingual (compound and co-ordinate) Navaho eighth grade pupils were compared on problem-solving tasks with IQ and reading comprehension controlled. Compound bilinguals did least well of the three groups. (N's = 20, 41, 44)

Stern, C., & Ruble, D. Teaching new concepts to non-English speaking preschool children. In J.E. Alatis and K. Twaddell (Eds.), English as a second language in bilingual education. Washington, D.C.: Teachers of English to Speakers of Other Languages, 1976.

This study examines the effect of three Headstart language programs (Spanish, N = 5; English, N = 5; Bilingual, N = 5) on the ability to acquire and utilize concepts for children of Mexican descent. There were no measurable differences among the three groups.

Swain, M. *Writing skills of grade 3 French immersion pupils.* Toronto: The Ontario Institute for Studies in Education, 1979. (mimeo).

This paper analyzes short stories written in English and French by French immersion students compared with regular English program students. Vocabulary skills, technical skills, grammatical skills and creativity were examined. The errors made by the students are discussed in detail. Skills in writing English stories compared favorably with control students; however, there were more errors in the French writing than in the English writing. (N's = 40 immersion students)

Swain, M., & Burnaby, B. Personality characteristics and second language learning in young children: A pilot study. *Working Papers on Bilingualism*, 1976, 11, pp.115-28.

Ontario French immersion pupils (N = 63) were compared with FSL pupils (N = 68) on 9 personality characteristics. Immersion pupils were more happy, talkative and perfectionist. High achievement in French correlated positively with perfectionism and negatively with talkativeness.

Swain, M., & Lapkin, S. Beginning French immersion at Grade 8. *Orbit*, 1977, *8* (4) pp.10-13.

Two classes of students (initial N = 55) in Peel County were immersed in French in grade 8 and followed to grade 13 with amounts of French gradually decreasing. Tests of English reading; French reading, writing, speaking, and listening; science; math; and study skills showed: (1) an early lag in English reading and science, (2) higher level of French proficiency, (3) better developed work skills, and (4) equal math skills of immersion students when compared with controls in core French programs (initial N = 54). Both groups had favorable attitudes to immersion classes.

Swain, M., Lapkin, S., & Andrew, C.M. Early French immersion later on. *Journal of Multilingual and Multicultural Development*, 1981, *2* (1), pp.1-23.

The results of the French immersion program at grades 6 and 8 of the Ottawa public school system (Barik and Swain, 1975 and 1978) show that in English language skills and work study skills, the immersion students perform as well as, or better than English program composition groups; that in mathematics and science, the immersion students performed as well as comparison groups; and that in French language skills, the immersion students' performance is approaching or equivalent to that of native speakers of French in some tests of French.

Torrance, E.P., Gowan, J.C., Wu, J.J., & Aliotti, N.C. Creative functioning of monolingual and bilingual children in Singapore. Journal of Educational Psychology, 1970, 61 (1), pp.72-5.

A total of 1063 monolingual and bilingual Chinese and Malayan junior-age children in Singapore were administered the Torrance Test of Creative Thinking. The monolinguals excelled the bilinguals on fluency and flexibility while the bilinguals excelled on originality and elaboration.

Trevino, B.G. Bilingual instruction in the primary grades. Modern Language Journal, 1970, 54, pp.255-6.

A total of 69 primary English and Spanish monolinguals in Texas were taught bilingually for three years. Their achievement in arithmetic (mechanical and problem solving) when compared with national norms supports the theory that a second language may be taught efficiently in the primary grades without adversely affecting the normal scholastic progress of any child.

Trites, R.L. Children with learning disabilities in primary French immersion. Canadian Modern Language Review, 1976, 33 (2), pp.193-207.

A study of the type of learning disabilities found in primary children who fail or do poorly in primary French immersion programs (N=32) compared with seven groups varying in language background, language of education, and disability (matched on age, sex and IQ). In spite of above average motor and sensory function, the French immersion difficulty group performed very poorly on a complex psychomotor problem-solving task.

Tsushima, W.T., & Hogan, T.P. Verbal ability and school achievement of bilingual and monolingual children of different ages. Journal of Educational Research, 1975, 68, pp.349-53.

Bilingual (N = 142) and monolingual (N = 265) American children in Japan in grades 3, 4 and 5 were tested in verbal ability and school achievement. Differences favoring the monolinguals became progressively more pronounced with age while controlling for nonverbal IQ.

Tucker, G.R., Hamayan, E., & Genesee, F.H. Affective, cognitive and social factors in second-language acquisition. *Canadian Modern Language Review*, 1976, 32, pp.214-26.

Early, late and non-immersion students in grade 7 (N's = 17, 28, 19) of middle social class were compared on French reading, language, listening and oral tests. Immersion students performed better than non-immersion students. Students who were higher motivated, had high need achievement and had positive attitudes toward French and its speakers performed best regardless of group. Being adventuresome and attempting to utilize French were also important for the late immersion students for listening and oral French.

Tucker, G.R., Otanes, F.T., & Sibayan, B.P. An alternate days approach to bilingual education. In J.E. Alatis (Ed.), *Bilingualism and language contact.* Washington, D.C.: Georgetown University Press, 1970.

The language proficiency and content mastery of grade one students in classes instructed bilingually was compared with those instructed monolingually in either English or Tagalog. The bilingually instructed pupils at the end of one year were comparable to the control students in oral English, Pilipino reading, Pilipino science and nonverbal social studies. (N = 33 bilingual students)

Veidt, F.P. German-English bilingual education: The Cincinnati innovation. *Unterrichtspraxis*, 1976, *9* (2), pp.45-50.

A one-year study of 151 first- and second-grade pupils enrolled in a bilingual program with German as a subject, medium of instruction and cultural focus for 70 minutes daily. Pre-post academic test scores compared with those of matched pupils showed equal or superior results.

Wijnstra, J.M. Education of children with Frisian home language. *International Review of Applied Psychology,* 1980, 29, pp.43-60.

Dutch language and arithmetic skills of Frisian-speaking k-3 children in different programs from Dutch monolingual and Dutch-Frisian bilingual schools were studied. Comparisons with Dutch-speaking children in Utrecht were also made. At the end of grade 3, Frisian pupils from the bilingual schools performed as well as other Frisian groups and the Utrecht group on tests of Dutch reading and language usage. There was no significant differences among the Frisian groups on arithmetic tests, but they all scored lower than the Utrecht group. A follow-up study in grade 6 confirmed the earlier findings.

BIBLIOGRAPHY OF OTHER LITERATURE REVIEWS AND THEORETICAL WORKS

Albert, M.L., & Obler, L.K. The bilingual brain. New York: Academic Press, 1978.

Andersson, T. Bilingual education: The American experience. Modern Language Journal, 1971, 55 (7), pp.427-40.

Baker, K.A., & de Kanter, A.A. An answer from research on bilingual education. American Education, 1983, 19 (6), pp.40-8.

The Board of Education for the City of Toronto. Towards a comprehensive language policy: The final report of the work group on third language instruction. Toronto: The Board of Education for the City of Toronto, March, 1982.

Carabello, J.N. Bilingualism and cognitive development. Pennsylvania: The Pennsylvania State University, 1982.

Cohen, A.D. The case for partial or total immersion education. In A. Simoes, Jr. (Ed.), The bilingual child. New York: Academic Press, 1976.

Cohen, A.D., & Swain, M. Bilingual education: The "immersion" model in the North American context. TESOL Quarterly, 1976, 10 (1), pp.45-53.

Cummins, J. Educational implications of mother tongue maintenance in minority-language groups. Canadian Modern Language Review, 1978(c), 34 (3), pp.395-416.

Cummins, J. The cognitive development of children in immersion programs. Canadian Modern Language Review, 1978(d) 34 (5), pp.855-83.

Cummins, J. The cross-lingual dimensions of language proficiency: Implications for bilingual education and the optimal age issue. TESOL Quarterly, 1980, 14 (2), pp.175-87.

Cummins, J. Language proficiency, biliteracy and French immersion. Canadian Journal of Education, 1983(a), 8 (2), pp.117-38.

Cummins, J. Heritage language education: A literature review. Toronto: The Minister of Education, Ontario, 1983(b).

Darcy, N.T. A review of the literature on the effects of bilingualism upon the measurement of intelligence. The Journal of Genetic Psychology, 1953, 82, pp.21-57

Darcy, N.T. Bilingualism and the measurement of intelligence: Review of a decade of research. The Journal of Genetic Psychology, 1963, 103, pp.259-82.

Diaz, R.M. Thought and two languages: The impact of bilingualism on cognitive development. In E.W. Gordon (Ed.) Review of research in education. Washington, D.C.: American Educational Research Association, 1983.

Diebold, A.R., Jr. The consequences of early bilingualism in cognitive development and personality formation. U.S. Department of Health, Education & Welfare, Office of Education, 1966.

Dulay, H., & Burt, M. Research priorities in bilingual education. Education Evaluation and Policy Analysis, 1979, 1 (3), pp.39-53.

Edwards, H.P., & Smyth, F. Alternatives to early immersion programs for the acquisition of French as a second language. Canadian Modern Language Review, 1976, 32 (5), pp.524-33.

Engle, P.L. Language medium in early school years for minority language groups. Review of Educational Research, 1975, 45 (2), pp.283-325.

Feenstra, H.J. Parent and teacher attitudes: Their role in second-language acquisition. London: London Board of Education, Educational Research Services, 1968.

Fishman, J.A., Cooper, R.L., Ma, R., et al. Bilingualism in the barrio. Indiana Univ. Publications, Lang. Science Monograph #7. The Hague, Netherlands: Mouton & Co., 1971.

Gamez, G.I. Reading in a second language: "Native language approach" vs "direct method". The Reading Teacher, 1979, 32 (6), pp.665-70.

Gardner, R.C., & Desrochers, A. Second-language acquisition and bilingualism: Research in Canada (1970-1980). Canadian Psychology, 1981, 22 (2), pp.146-62.

Gardner, R.C., Gliksman, L., & Smythe, P.C. Attitudes and behavior in second language acquisition: A social psychological interpretation. Canadian Psychological Review, 1978, 19 (3), pp.173-86.

Gardner, R.C., & Lambert, W.E. Motivational variables in second-language acquisition. Canadian Journal of Psychology, 1959, 13 (4), pp.266-72.

Genesee, F. The suitability of immersion programs for all children. The Canadian Modern Language Review, 1976, 32, pp.494-515.

Genesee, F. Scholastic effects of French immersion: An overview after ten years. Interchange, 1978/79, 9 (4), pp.20-9.

Gezi, K. Bilingual-bicultural education: A review of relevant research. California Journal of Educational Research, 1975, 25 (5), pp.223-39.

Gudschinsky, S.C. Literacy in the mother tongue and second language learning. (Paper presented at Conference on Child Language, Chicago, Illinois, November, 1971.) Laval University, Quebec: International Centre on Bilingualism, 1971.

Hatch, E.M. Psycholinguistics: A second language perspective. Rowley, Mass.: Newbury House, 1983.

Hernandez-Chavez, E., and others. The federal policy toward language and education: Pendulum or progress? A response to the de Kanter/Baker review. Monograph No. 12. Sacramento: California State University, Cross-Cultural Resource Centre, 1982.

Hoffman, M.H. The measurement of bilingual background. New York: Bureau of Publications, Teachers College, Columbia University, 1934.

Jensen, J.V. Effects of childhood bilingualism (I). Elementary English, 1962, 39, pp.132-43.

Jensen, J.V. Effects of childhood bilingualism (II). Elementary English, 1962, 39, pp.359-66.

Jones, W.R. A critical study of bilingualism and non-verbal intelligence. British Journal of Educational Psychology, 1960, 30, pp.71-6.

Lambert, W.E. Developmental aspects of second-language acquisition: I. Associational fluency, stimulus provocativeness, and word-order influence. Journal of Social Psychology, 1956, 43, pp.83-9.

Lambert, W.E., Havelka, J., & Gardner, R.C. Linguistic manifestations of bilingualism. American Journal of Psychology, 1959, 72, pp.72-82.

Lambert, W.E. Culture and language as factors in learning and education. In A. Wolfgang (Ed.), Education of immigrant students: Issues and answers. Toronto, The Ontario Institute for Studies in Education, 1975.

Larter, S., Cheng, M., et al. Post secondary plans of grade eight students and related variables. Toronto: The Board of Education for the City of Toronto, Research Department, 1982, #165.

MacNab, G.L. Cognition and bilingualism: A reanalysis of studies. Linguistics, 1979, 17, pp.231-55.

Macnamara, J. The bilingual's linguistic performance - A psychological overview. Journal of Social Issues, 1967, 23 (2), pp.58-77.

Masemann, V.L. Multicultural programs in Toronto schools. Interchange, 1978-79, 9 (1), pp.29-44.

Paulston, C.B. Research. In Bilingual education: Current perspectives (Vol. 2, Linguistics). Arlington, Va.: Center for Applied Linguistics, 1977.

Paulston, C.B. Bilingual/bicultural education. In L.S. Shulman (Ed.), Review of research in education, Itasca, Ill.: Peacock, 1978.

Penfield, W., & Roberts, L. Speech and brain-mechanisms. New Jersey: Princeton University Press, 1959.

Piaget, J. The child's conception of number. London: Routledge & Kegan, 1952(a).

Piaget, J. The origins of intelligence in children. (Trans.: M. Cook), New York: International Universities Press, Inc., 1952(b).

Rotberg, I.C. Federal policy in bilingual education. American Education, 1982, 18 (8), pp.30-40.

Saif, P.S., & Sheldon, M.E. An investigation of the experimental French programme at Bedford Park and Allenby public schools. Toronto: The Board of Education for the City of Toronto, Research Department, 1969, #75.

Shapson, S.M., & Purbhoo, M. Second language programmes for young children. Toronto: The Board of Education for the City of Toronto, Research Department, 1974, #122.

Shore, M.S. The content analysis of 125 Title VII bilingual programs funded in 1969 and 1970. Washington, D.C.: Office of Bilingual Education (DHEW/OE), December, 1974.

Snow, C.E., & Hoefnagel-Höhle, M. The critical period for language acquisition: Evidence from second language learning. Child Development, 1978, 49, pp.1114-28.

Spolsky, B. A model for the evaluation of bilingual education. International Review of Education, 1978, 24 (3), pp.347-60.

Spolsky, B., & Cooper, R.L. (Eds.) Case studies in bilingual education. Rowley, Mass.: Newbury House, 1969.

Stern, H.H. *Issues in early core French: A selective and preliminary review of the literature: 1975-1981.* Toronto: The Board of Education for the City of Toronto, Research Department, 1982, #163.

Stern, H.H., and others. *Three approaches to teaching French.* Ontario: The Ministry of Education, 1976.

Swain, M. Time and timing in bilingual education. *Language Learning,* 1981, 3, pp.1-15.

Swain, M. French immersion programs across Canada: Research findings. *The Canadian Modern Language Review,* 1974, *31* (2), pp.117-29.

Swain, M. Bibliography: Research on immersion education for the majority child. *The Canadian Modern Language Review,* 1976, pp.592-96.

Swain, M. French immersion: Early, late or partial? *The Canadian Modern Language Review,* 1978, *34* (3), pp.577-85.

Swain, M., & Barik, H.C. Bilingual education for the English Canadian: Recent developments. In A. Simoes, Jr. (Ed.), *The bilingual child.* New York: Academic Press, 1976.

Troike, R.C. Research evidence for the effectiveness of bilingual education. *NABE Journal,* 1978, *3* (1), pp.13-24.

Tucker, G.R., et al. *Bilingual education: Current perspectives. Volume 2: Linguistics.* Arlington, Va.: Centre for Applied Linguistics, 1977.

Vaid, J., & Genesee, F. Neuropsychological approaches to bilingualism: A critical review. *Canadian Journal of Psychology,* 1980, *34* (4), pp.417-45.

Vygotsky, L.S. *Thought and language.* Mass.: The M.I.T. Press, 1962.

Vygotsky, L.S. *Mind in society.* Cambridge, Massachusetts: Harvard University Press, 1978.

Wright, E.N., & Tsuji, G.K. *The grade nine student survey: Fall 1983.* Toronto: The Board of Education for the City of Toronto, Research Department, 1984, #174.

Yap, K.O. *Standards for Title VII evaluations: Accommodation for reality constraints.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, 1984.